

NATURAL GAS SUPPLY AND PRICES

HEARING
BEFORE THE
COMMITTEE ON
ENERGY AND NATURAL RESOURCES
UNITED STATES SENATE
ONE HUNDRED EIGHTH CONGRESS
FIRST SESSION
TO RECEIVE TESTIMONY REGARDING NATURAL GAS SUPPLY
AND PRICES

FEBRUARY 25, 2003



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NATIONAL GAS SUPPLY AND PRICES

TUESDAY, FEBRUARY 25, 2003

U.S. SENATE,
COMMITTEE ON ENERGY AND NATURAL RESOURCES,
Washington, DC.

The committee met, pursuant to notice, at 2:05 p.m. in room SD-366, Dirksen Senate Office Building, Hon. Pete V. Domenici, chairman, presiding.

OPENING STATEMENT OF HON. PETE V. DOMENICI, U.S. SENATOR FROM NEW MEXICO

The CHAIRMAN. The hearing will please come to order. I know other Senators have other meetings and will be here shortly. We are going to depart from the plan for just 5 or 6 minutes here and let our new Senator, Senator Murkowski, ask a few questions because she has to leave us, so if Senator Bingaman does not object—and I have talked with him, and he is in accord—you can proceed, Senator, and then we will go back into the regular order.

Senator Murkowski.

Senator MURKOWSKI. Thank you, Mr. Chairman, and I do appreciate your indulgence, and that of the committee, to allow me to ask just a couple of brief questions initially, and I know that this is out of order, as we are not having an opportunity to hear the testimony.

I have had a chance to read it, and I am looking forward to meeting hopefully with several of you individually afterwards, but if I can just begin with you, Mr. Caruso, in your position with the Energy Information Administration, I understand that the Energy Business Watch had released a report just this morning predicting a crisis in the natural gas markets, specifically, found total natural gas supplies for this year likely to be 1.5 to 2.0 tcf below the most recent EIA forecast for 2003, and I would just like your reaction to that.

Mr. CARUSO. Our estimate is that natural gas production was down about 2.3 percent last year. However, we do expect that there will be some recovery in 2003, so at least our best assessment of 2003 on the supply side as of today is that we are expecting a slight improvement, as opposed to current projections.

Senator MURKOWSKI. So even though there is a recognition it is a little bit lower, you are relatively confident that on the domestic gas supplies that we can sustain, we can meet the demand we need for natural gas in America?

Mr. CARUSO. That is our current assessment, but I must also mention that we are expecting an average price for 2003 of \$4.30

an mcf, which is a substantial increase, on average, compared to last year. Yes, we can meet it, but at a fairly substantial price increase.

Senator MURKOWSKI. Then if I may, Mr. Welch, have you had an opportunity to review this report from Energy Business Watch?

Mr. WELCH. No, ma'am, I have not had a chance to review this report out today, but I would say that the information that we are seeing as the production is rolling up to us indicates that we in all likelihood reduce production in the United States about 5 percent in 2002, and that trend is likely to continue. We are heavily drawing down the natural gas inventories right now. I feel like there will be plenty of gas to fuel the market, but it is going to come from a combination of the production plus potentially additional withdrawals from storage.

Senator MURKOWSKI. Well, how can the United States then reduce this gap, the gap between our supply and demand, without becoming more dependent then on foreign sources?

Mr. WELCH. I guess we will get right into it. The sources we see around are three major areas of accessibility in the United States and North America. Those three are the Rocky Mountain areas, which have some additional growth potential, Canadian frontier gas in the Mackenzie Delta, and Alaska gas, which is by far the largest potential source of new natural gas. We already have about 35 trillion cubic feet discovered there, and Government estimates are that there are as much as 100 to 150 additional trillion cubic feet of natural gas to be discovered in Alaska.

Senator MURKOWSKI. In Alaska?

The CHAIRMAN. You are interested in that, I assume.

[Laughter.]

Senator MURKOWSKI. Yes, I am. It always comes back to Alaska. Is that not the way it is? Let us see, how much lower 48 and Canadian production currently has some type of Government incentive involved?

Mr. WELCH. I would say that when you are looking at the total domestic supply situation, you have several different types of basins that are incented, Deepwater, for example, Deepwater royalty relief, section 29 gas. In aggregate, I would say that somewhere in the neighborhood of 20 to 30 percent of the production in the United States would fall under some sort of special tax regime.

Senator MURKOWSKI. And that includes the royalty reductions and—

Mr. WELCH. That would not include Canada. If you throw Canada in there, probably another 5 percent or so.

Senator MURKOWSKI. Okay. Then, given the gap between the supply and the demand, if the Alaska natural gas pipeline can come on line, and given what you believe is available up there, in your opinion, how is this going to affect the domestic market? In other words, are we going to be displacing lower 48 gas with our Alaskan gas?

Mr. WELCH. Well, my belief is that most likely the swing production will be imported LNG. I personally believe we are going to need all sources of North American gas, gas from the lower 48, gas from Alaska, also gas from Canada, and we will have to supplement that with additional imports of LNG, so I think that we are

going to need all the gas that we can produce from this continent to satisfy the natural gas demand over the next coming decades.

Senator MURKOWSKI. And what kind of time lines are we talking about right now?

Mr. WELCH. For the Alaska gas pipeline? Specifically, if we had the legislation that enabled us to go forward this year, the first gas would be sometime between the end of 2011, 2012 time frame, if everything went right.

Senator MURKOWSKI. Now, the concern, of course, that has been presented with any kind of incentives, or call them fiscal enablers, whatever, is that it will somehow or other result in unfair pricing treatment towards other gas that is produced domestically. Can you comment on that?

Mr. WELCH. I can comment on this, and I have a slide, actually, to this effect that I did not have in my written testimony, if I could put that up, then I would be happy to explain that.

Most people believe that the fiscal terms that exist throughout the United States are similar in just about every basin, but the truth of the matter is that the fiscal terms that exist are different in different parts of the United States and in Canada, and what this highlights at the top there is the split between discounted cash flow that goes to the investor and discounted cash flow that goes to the Government, and in the case of Alaska, 84 percent of the value created by the project goes to the Government and 16 goes to the investors who take all of the capital risk.

In the case of the Canadian frontier regime, the investor keeps 26 percent.

The Gulf of Mexico shelf, which is conventional Gulf of Mexico, 31 percent goes to the investor, and Gulf of Mexico Deepwater, because of the Deepwater royalty relief, et cetera, 35 percent goes to the investor. Section 29 gas is being contemplated in both the House and the Senate for extension, and that would either be 27 or 33 percent.

So you can see, in looking at the Alaska fiscal terms, we are disadvantaged with respect to the fiscal terms that exist in Alaska relative to these other, which are very important contributing basins, and this chart in green, which are the lower ones, show instances where a policy has been enacted to actually materially impact the supply that we have domestically.

Senator MURKOWSKI. Mr. Chairman, I have some other questions, but I will be meeting, as I said, with some of the members of the panel later. I do have some statements that I would like to submit for the record, if I may.

The CHAIRMAN. Your statements will be made a part of the record.

If you have additional requests in writing, we will submit those, and we thank you very much, and hope you are able to keep your schedule.

Senator MURKOWSKI. Thank you. I have another 5 minutes, so I can listen. See, we were so quick here.

The CHAIRMAN. Okay. Very good. Thank you. Thank you very much, Senator Bingaman.

I think we all know why we are here. The supply outlook and the recent increases in price obviously indicate to us that we have

to try our very best to see what is happening and to get evidence from the experts as to what is going to happen in the foreseeable future, and do we have the available domestic resources to meet the growing demand, and the outlook for the growing demand, where are these resources, and what is being done to develop the gas and bring it to market, what has been the impact on consumers, and today we have four witnesses that are going to talk about these subjects one way or another, and we are going to take them in the following order, at their request.

The Honorable Guy Caruso, Administrator of the Energy Information Agency. He is going to testify on supply and demand outlook, as well as address the price outlook. Mr. David Welch, president of BP Alaska-Canadian operations, representing producers and providing testimony on the U.S. reserves and production outlook, and we have Mr. Keith Rattie, president and CEO of Questar, will provide testimony regarding natural gas pipelines and whether or not we will have sufficient infrastructure to bring these new supplies on.

Then Robert Best, chairman and CEO of Atmos Energy will provide testimony on behalf of the American Gas Association regarding the impact that price increases will have on the industrial and residential consumers.

I am very appreciative of the witnesses joining us today. Actually, when we started setting these meetings up, we were not, certainly not aware that the situation would be exactly as it is today. It has become more volatile and changed more rapidly than we thought from my standpoint.

I am going to forego opening statements and yield to Senator Bingaman, and then the witnesses in the order I stated.

[The prepared statements of Senators Domenici, Bunning and Johnson follow:]

PREPARED STATEMENT OF HON. PETE V. DOMENICI, U.S. SENATOR
FROM NEW MEXICO

Last week, this Committee held a hearing to address the important issue of oil supply and prices in the United States. Witnesses spoke to the bleak picture of rising demand, rising prices and declining domestic supply. Today, we turn to the situation facing natural gas, and I fear the outlook is equally grim. Headlines tell the story of rising gas prices and the impact it is having on consumer heating bills as well as the impact to our economy. However, despite recent price spikes, gas production has not responded as it has in years past.

In this year alone, gas supply is expected to decrease by 1 billion cubic feet (Bcf) per day, while demand in just the month of February is projected to be up 2.8 Bcf per day. Even after the winter heating season ends, gas supplies nationwide will be down nearly 30 percent. Because those supplies must be replenished, gas prices will continue to rise. Higher prices has led to some additional gas production from unconventional sources, but on the whole, the U.S. is still increasing imports in order to meet demand.

Even more troubling, most new production in the United States today appears to be coming from existing basins. Not only does this deplete proven supplies at a higher rate, but failure to develop new wells leaves us with little to plan for in the future. Industry is turning away from exploratory drilling in the U.S., citing such obstacles as access to multiple use lands, burdensome environmental regulations, and disincentives in the tax code. The Energy Information Administration states that reducing the restrictions to multiple use lands alone would increase available resources by 87 billion cubic feet. Opening these Federal lands to environmentally safe production would secure domestic supplies while leaving untouched our priceless national treasures—National Parks, wilderness areas, and National Monuments.

In addition to concerns over gas supply and prices, I am also troubled by the aging infrastructure. Adequate supplies of gas are useless without a means of delivery. According to EIA, higher prices over the next ten to fifteen years should stimulate the construction of the Alaskan North Slope and MacKenzie Delta pipelines, but this is just a start. Serious investment in pipelines is necessary to encourage development and stabilize prices. I hope today's witnesses will be addressing issues related to the existing infrastructure.

In spite of the bleak forecasts, I do believe that there are some positive policy options. In the short term, the Omnibus Appropriations bill that was just signed by the President last week allocated \$1.7 billion to the Low Income Home Energy Assistance Program, known as LIHEAP. These funds will go to those most harmed by skyrocketing energy prices—the working poor, the elderly, disabled persons, and families transitioning from welfare to work. In addition, in the 107th Congress, we passed a pipeline safety bill to protect the hard working individuals who are out there every day making sure the infrastructure we do have continues the flow of resources.

These are positive steps, but much more needs to be done. The comprehensive energy bill debated in the last Congress contained loan guarantees for the Alaska Gas Pipeline, as well as provisions to stimulate exploration of unconventional sources, such as coalbed methane, shale, and tight sands. Unfortunately, we could not resolve differences between House and Senate versions of the bill prior to adjournment. So in the 108th Congress, we begin again.

Last year's bill was a good start, but on the whole focused too much on regulation and not enough on securing domestic supplies of energy. As more and more production shifts overseas to increasingly unstable and even hostile regimes, the need for a comprehensive national energy policy becomes terribly serious. I am hopeful that as this Committee moves forward in the development of an energy bill for the 108th Congress, we will take meaningful steps to encourage production in a clean and sustainable manner that preserves both our environment and our national security.

Today's hearing is part of that process. I expect the panel before us will provide valuable insight and information that will aid in the development of a strong energy bill. I look forward to hearing from each of you.

PREPARED STATEMENT OF HON. JIM BUNNING, U.S. SENATOR FROM KENTUCKY

Thank you, Mr. Chairman.

I am pleased to have this opportunity to examine the state of natural gas supply and prices in our country.

Natural gas is an important form of energy for the United States.

The United States is currently facing an energy crisis. We need to have access to adequate supplies of natural gas at affordable prices.

Natural gas prices have increased this year almost 70% over the last year. The long cold winter we have experienced this year, the Venezuela crisis, and the threat of a possible war with Iraq have all made matters worse.

I am concerned by the increase in price because higher prices place a strain on the American family's budget by causing consumer products to increase. It simply costs more to haul and move these goods, and in turn many times the increase is passed on to the consumer. This in turn affects our economic recovery.

Now is the time for us to boost our domestic energy sources as well as promote conservation. We need a serious dual track for a real national energy policy.

I look forward to hearing about the status of our natural gas supply today. I also appreciate the time our witnesses have taken today to come testify.

Thank you.

PREPARED STATEMENT OF HON. TIM JOHNSON, U.S. SENATOR
FROM SOUTH DAKOTA

Mr. Chairman, this hearing could not come at a better time. Natural gas prices are currently higher than they have been in recent history. Traditionally, natural gas prices were relatively stable and low. But as demand for natural gas has increased and supplies have become tighter, price fluctuations have become the rule rather than the norm. Just yesterday, wholesale natural gas prices spiked almost 40% in one day.

Those who heat their homes with natural gas are all too familiar with the huge fluctuations in prices over the last few years. Last year, we had a warm winter and abundant supplies. This year, the winter has been cold, the supplies are lower, and the economy is slower. All of this is creating difficulties for consumers and could

affect our energy security for years to come. It is Congress' responsibility to help find solutions to this ongoing problem.

It is clear that unknown factors like weather and sudden changes in demand can still impact prices. However, it also clear that demand for natural gas is growing rapidly, particularly because of the increasing reliance of using this resource for electricity generation. Hence, more than most natural resources, natural gas is subject to the boom-bust cycle that the nation continues to experience in many sectors of the energy system. We have seen similar effects happening with gasoline prices recently.

Like other areas of the country, these fluctuations directly affect the residents of South Dakota. Almost half of the state depends on natural gas for their heating needs. Winters are tough in South Dakota and many of my constituents have limited income. Spikes in heating bills don't help. Farmers in my state are also feeling the crunch. Natural gas is the fundamental feedstock ingredient and the major cost component for the production of nitrogen fertilizer. The cost of natural gas represents 70 to 90 percent of the production cost of one ton of anhydrous ammonia nitrogen fertilizer. With huge increases in natural gas prices, farmers in my state, already reeling from a prolonged drought, will be even more pressed to make ends meet.

As a member of the Senate Energy and Natural Resources Committee, I am committed to alleviating the boom-bust cycle that we constantly experience. In the last Congress, the energy bill included provisions that eased restrictions and streamlined regulations for increased responsible exploration of natural gas and oil, both on-land and offshore. In particular, it removed barriers to allow the construction of a natural gas pipeline from Alaska to the lower 48 states. There are enormous natural gas reserves in Alaska but there is physically no way to move it. Construction of this pipeline would greatly alleviate any future shortages that could occur.

We must continue these and other efforts this year to help ensure our energy security for the future. Unlike oil, natural gas is largely a domestic product. It is not as subject to the political winds of unstable areas like the Middle East and Venezuela. There is a tremendous supply of natural gas in the lower 48 states. We need to consider ways to tap these reserves in an environmentally safe manner. Otherwise, we may face a huge supply/demand gap in the very near future and may end up relying more on liquified natural gas imports from more unstable areas of the world like Algeria, Nigeria and Oman. At a time when our energy security is so inextricably tied to areas of the world where terrorists often reside, we must concentrate of energy supplies that our country can control.

A balanced approach to improve the nation's energy situation is the best way to break the nation out of the boom-bust cycle we constantly face and bring more stability to the system. Combining increased exploration of traditional fossil fuels, like natural gas, with greater usage of clean, renewable fuels and sources of energy would help to displace the level of foreign oil we currently use. During these difficult times, it is imperative that we find ways to improve and stabilize the nation's energy security and reduce our dependence on foreign oil.

The CHAIRMAN. Senator Bingaman.

STATEMENT OF HON. JEFF BINGAMAN, U.S. SENATOR FROM NEW MEXICO

Senator BINGAMAN. Thank you very much, Mr. Chairman. I welcome all of the witnesses. I did want to just make a very short opening statement. We have, as I see it, two issues. One is short-term, one is long-term. How do we deal with both challenges?

I just received today, in the last hour or so, a fax from John Huntsman, who is with Huntsman Corporation, the largest, privately-owned chemical manufacturer in the world. I just wanted to read a couple of the things he said in that fax and then just have that for you to respond to in your testimony.

He says, to date, "natural gas prices in America increased by over 40 percent from \$6.61 to \$9.60." As I say, I received this in the last hour. I do not know if that is still where the price is or not. Mr. Caruso is indicating to me that it is higher than that now.

“This unparalleled spike in prices represents the highest natural gas prices ever. There is pure manipulation going on to cause prices to increase so dramatically . . . It is killing manufacturing and commerce in America . . . We are losing thousands of jobs and our entire chemical industry because of the refusal of the administration to adopt an energy policy. I am frightened by this.”

He goes on to talk about his view that there is fraudulent manipulation going on by oil companies and futures traders in the New York Mercantile Exchange and that is the only explanation for this kind of dramatic increase that he is talking about today.

I would be interested in any suggestions that any of you could give us as to what can be done by the administration and the Congress to deal with this short-term crisis, because obviously this is not just impacting the chemical industry. It is going to impact consumers very dramatically if the situation continues.

Thank you.

[The prepared statement of Senator Bingaman follows:]

PREPARED STATEMENT OF HON. JEFF BINGAMAN, U.S. SENATOR
FROM NEW MEXICO

Thank you, Mr. Chairman. This is an important and timely hearing. Yesterday, the Henry Hub spot price for natural gas shot up to \$12.50 per mmbtu and the NYMEX futures price for March increased by 38% in one day—from \$6.60 on Friday to over \$9.00.

It was only two winters ago that natural gas prices spiked as high as \$10 per thousand cubic foot and caused significant economic hardship to residential, commercial and industrial consumers. Prices remained high throughout the first half of 2001. Producers responded with increased drilling. The natural gas rig count rose to over 1000 rigs in July 2001—almost 3 times the number of rigs working in 1999. Production increased and prices moderated for several months. However, gas prices began to increase this summer, and once again this winter we are experiencing a heating season with very high natural gas costs for consumers.

For the manufacturing sector these prices are particularly painful. I'd like to insert for the record a message I received today from a chemical manufacturer. I'll quote part of his message: “Our company and all others in the chemical industry will go out of business with gas prices this high. Billions of dollars will be lost in export trade. Millions of jobs are at risk . . . The manufacturing sector is . . . becoming uncompetitive with the rest of the world.”

In this context it is urgent that this committee thoroughly explore what is happening with gas supply this afternoon.

Is this winter a mirror image of 2001? Or are there different supply and demand forces at work today? Are domestic producers responding to these high prices with increased drilling as they did in 2001? Many analysts say the drilling response has been tepid—why? When can consumers expect some moderation in their gas costs? Today's hearing is intended to provide us with the answers to these questions.

Our hearing will also examine the long term gas supply challenges facing the North American market. Over the next decade, we see the demand for natural gas in the U.S. growing faster than our current sources of production can meet. What are our environmentally acceptable options for new sources of supply? Will we have increased imports of liquified natural gas (LNG) or additional supplies from Canada and Alaska? Will coalbed methane or the deep water Gulf provide additional gas resources? What are the obstacles to bringing those supplies to market? What policy choices should we in Congress make to assure that natural gas supply is adequate and prices are affordable?

On the demand side, natural gas for power generation is projected to see the fastest growth. How will potential changes in environmental and energy policies—such as climate change mitigation or the promotion of renewable energy—affect that demand growth? How does the growth of gas use for power generation affect the more traditional uses of natural gas for industrial processes, and residential heating?

We have an excellent panel of witnesses before us to address these and many other questions, Mr. Chairman. I look forward to hearing from them.

The CHAIRMAN. Thank you very much. Who is this gentleman?

Senator BINGAMAN. John Huntsman. He is the chairman and CEO of Huntsman Corporation of Salt Lake City, which is the largest chemical manufacturer in the country.

The CHAIRMAN. Let me suggest—my few comments in rebuttal, not knowing nearly as much as he knows, but if he is as accurate on the facts as he is on who is responsible for not having an energy policy, then he is all wet, because he started the letter, said the administration has no energy policy. I think they sent us one. We did not produce one. The House did, the Senate did not—or the Senate did. We did not come up with one. So if he would have said failure on the part of Congress to come up with energy policy, I might have a lot more credence in the rest of his suggestions of knowledge.

Having said that, I think he raises a good question and we ought to try to answer it if we can.

Let us proceed with Mr. Caruso.

**STATEMENT OF GUY F. CARUSO, ADMINISTRATOR,
ENERGY INFORMATION ADMINISTRATION**

Mr. CARUSO. Thank you, Mr. Chairman. Thank you for this opportunity to appear today to discuss an outlook for the critical natural gas supply and prices in this country. My remarks will highlight the growing role that natural gas is playing in meeting U.S. energy needs not only in the short-, but in the longer-term, and I will be referring to the Energy Information Administration's Short-Term Energy Outlook and its long-term Annual Energy Outlook in my remarks.

I should note, of course, these projections are not meant to be exact predictions of the future but, rather, they represent what we believe is a highly likely energy future, given the technology and demographic trends we are witnessing, the current laws, policies, and regulations, indeed, including consumer behavior.

The current U.S. natural gas market, as you have noted, is extremely tight, with rapidly increasing prices in recent days in particular. Consumption has been exceeding supply in recent months. Given this tight market, the amount of natural gas in storage has declined steadily and prices have increased sharply. Just to follow up on Senator Bingaman's point, the spot price at Henry Hub just before we left the Department was between \$18 and \$20 an mcf, so you can see it has moved quickly.

The current trend is part of a general volatility in natural gas policies that we have witnessed in recent years. The first chart here shows that, and it also shows our outlook for prices over the next 2 years. As I mentioned to Senator Murkowski, we are projecting a continuation of this price above \$4 during 2003 and 2004 in our latest Short-Term Energy Outlook.

There are three major market forces behind this recent rise in both consumption and prices. The harsh winter weather, particularly in those areas of the country that are large consumers of heating fuels, the interruption of Venezuelan oil exports, which has been a primary factor in the oil price increases, and strong natural gas demands in both the industrial and electric power sectors.

U.S. demand for natural gas is expected to remain strong, as indicated by these prices, in the next 12 to 18 months. We do expect,

however, that after this period of high prices there will be a supply response, and what we believe we are seeing now is a lagged impact of the relatively low drilling for gas that we witnessed in 2002, following high levels in 2001. Recent drilling levels have been increasing, as measured by rig counts, and are rather high relative to past history, and we expect this would continue, given the price incentives we are seeing now.

Now, of course, as already mentioned in earlier remarks, increased pipeline capacity will be needed clearly to ease some of these regional bottlenecks, such as those in the Rocky Mountains, in order to deliver the kinds of volumes of gas we believe will be demanded by end users in the next 12 to 18 months.

Turning to the longer-term outlook, this next chart shows that by 2025, we expect U.S. natural gas consumption to reach almost 35 trillion cubic feet, increasing at an average annual rate of 1.8 percent. The largest sectoral growth in demand during this time period will occur in electric power generation, as shown by the line in blue. Natural gas is the fastest growing fossil fuel in our energy mix, because it is the cleanest-burning, and in the generating sector it has higher fuel efficiencies, lower emissions, lower capital cost, and shorter construction lead times than any of its competitors.

Of course, lining up the supplies and building the infrastructure needed to meet this kind of demand will be key as we look out over this next couple of decades. Factors that are driving this process, of course, include the technological progress we have already seen, the macroeconomic trends, weather, as we are witnessing this winter, and geopolitical factors, particularly for some of the oil, LNG, and other gas imports.

The projected increases in domestic gas and imports are expected to satisfy the growing mid-term demand for natural gas as a result of these higher price incentives. The longer-term domestic natural gas production is projected to rise more slowly than demand, only 1.3 percent per annum, so that the difference between consumption and supply will be made up by growing net gas imports, as shown in this chart.

Net imports are projected to increase to about 22 percent of our total demand by 2025. For reference, we are at about 16 percent this year. Both LNG and pipeline imports are projected to increase 2 tcf each by 2025, compared with current levels.

However, a variety of additional new, large volume suppliers also will be needed, and these sources will likely include deep and ultra-deep offshore projects in the Gulf of Mexico, unconventional gas, mainly in tight sands in the Rocky Mountains. We expect the Mackenzie Delta pipeline will need to be built, as well as an Alaskan natural gas pipeline that will deliver gas during this time frame. As shown in this chart, we expect these additional supplies over the next 2 decades.

For the longer-term, the United States does have a large endowment of natural gas resources. Based on estimates by the U.S. Geological Survey and the Minerals Management Service, we estimate that total resources of gas are 1,289 tcf. These resources must be developed to offset the sharp decline we are seeing in the existing fields, and this chart shows that the new natural gas supply will

come from all of these regions, both the unconventional gas in the Rocky Mountains tight sands, Alaska, Mackenzie Delta, other Canada and LNG.

You can see that the black area of the chart shows that the Alaskan gas comes on in the latter part of the forecast period. We have it in the reference case coming in 2021, based on our assumptions of where prices and technology are moving. However, that date can change based on prices differing from our assumptions, or technology changing, or other policy changes which I know this committee has studied in the past.

The lower 48 States will need to increase interstate gas pipeline capability in order to accommodate this growth and to meet the consumption we expect will be demanded. These changes in natural gas production and delivery likely will result in uneven natural gas prices over this time frame as these new supplies come on line, but in general we do expect, after some reduction from the current gas prices, that it will resume an upward trend towards a price in nominal terms of about \$7 an mcf by 2025. That is the kind of gas price path we see over the longer-term.

We expect a reduction in the current price after this extremely unusual period now, but an upward trend towards higher prices in order to bring forth the kinds of sources we see in this chart.

The CHAIRMAN. Mr. Caruso, I do not know that we set a time before each of you started. Perhaps I failed to do that, but we are getting pretty close. Can you summarize?

Mr. CARUSO. That was my last substantive point. I just want to conclude, Mr. Chairman, by saying we do face, as you have all mentioned already, highly short-term volatile natural gas markets, and in the long-term, we face challenges to meet the kind of demand outlook that we are projecting. We at the Energy Information Administration look forward to working with you and members of the committee to meet these challenges.

And thank you very much again.

[The prepared statement of Mr. Caruso follows:]

PREPARED STATEMENT OF GUY F. CARUSO, ADMINISTRATOR,
ENERGY INFORMATION ADMINISTRATION

Mr. Chairman and Members of the Committee: I appreciate the opportunity to appear before you today to discuss the outlook for natural gas supply and prices in the United States.

The Energy Information Administration (EIA) is the statutorily chartered statistical and analytical agency within the Department of Energy. We are charged with providing objective, timely, and relevant data, analysis, and projections for the use of the Department of Energy, other Government agencies, the U.S. Congress, and the public. We do not take positions on policy issues. We produce data and analysis reports that are meant to help policy makers determine energy policy. Because we have an element of statutory independence with respect to the analyses that we publish, our views are strictly those of EIA. We do not speak for the Department, nor for any particular point of view with respect to energy policy, and our views should not be construed as representing those of the Department or the Administration. EIA's baseline projections on energy trends are widely used by Government agencies, the private sector, and academia for their own energy analyses.

The projections in this testimony are from the February 2003 *Short-Term Energy Outlook* (STEO) and the *Annual Energy Outlook 2003* (AEO). These projections are not meant to be exact predictions of the future, but represent a likely energy future, given technological and demographic trends, current laws and regulations, and consumer behavior as derived from known data. EIA recognizes that projections of energy markets are highly uncertain, subject to many random events that cannot be

foreseen, such as weather, political disruptions, strikes, and technological breakthroughs. (Many of these uncertainties are explored through alternative cases.)

The AEO is based on data available through September 2002; the STEO projections reflect more recent data. As a result, the short-term projections in the AEO and the February STEO do not necessarily match.

OVERVIEW AND ASSUMPTIONS

EIA's *Short-Term Energy Outlook* is a monthly forecast report that addresses a wide range of issues in energy markets. The forecast has a 2-year horizon, based on simulations of EIA's Short-Term Integrated Forecasting System (STIFS), incorporating the latest exogenous information available. The historical energy data are mostly EIA data regularly published in other EIA publications. STIFS is driven principally by three sets of assumptions or inputs: estimates of key macroeconomic variables, world oil prices, and weather. Macroeconomic estimates are produced by Global Insight (formerly DRI/WEFA) but are adjusted by EIA to reflect our own assumptions about the world price of crude oil, energy product prices and other factors, which may affect the macroeconomic outlook.

The *Annual Energy Outlook* is produced using the National Energy Modeling System (NEMS), a computer-based, energy-economy modeling system of U.S. energy markets through 2025. NEMS projects annual production, imports, consumption, and prices of energy, subject to assumptions on macroeconomic and financial factors, world energy markets, resource availability and costs, behavioral and technological choice criteria, cost and performance characteristics of energy technologies, and demographics. Two of the key assumptions in NEMS are world oil prices and macroeconomic growth.

World oil prices averaged about \$23.15 per barrel in 2002 in 2001 dollars. Between now and 2025 they are expected to rise to about \$26.60 a barrel in 2001 dollars, as world oil demand increases from 76 million barrels per day to 123 million barrels per day. In 2003 real gross domestic product (GDP) is projected to grow by 2.8 percent over 2002 and to grow at an annual average rate of 3.0 percent between 2001 and 2025.

SHORT-TERM NATURAL GAS OUTLOOK

Over the last twelve months the U.S. natural gas market has tightened significantly as principal demand and supply factors have worked to swing market conditions from being oversupplied (excess storage) to being relatively undersupplied (low storage). An approximate doubling of average spot prices has ensued. Strong underlying domestic demand for natural gas has been boosted by short-term or cyclical factors (including weather and oil market shifts) while domestic natural gas resource development efforts have faded relative to the spectacular levels of activity seen in 2001.

A salient feature of the contrast between U.S. natural gas market conditions in 2003 and those during 2002 is the dramatic difference in the availability of natural gas in storage as a cushion between strong demand growth and (at least somewhat) less robust gains in domestic production and other new supply. Steady pressure on wellhead supply from strong demand, stemming from weather-related factors, spillover from tight oil markets, and expected growth from the industrial and electric power sectors, is expected to keep domestic natural gas prices high in 2003 and at risk for significant volatility through at least the next 12 to 18 months. Expected strong levels of domestic natural gas drilling and development should provide increases in gross productive capability through 2004 but increases in pipeline capacity will be needed to insure maximum growth in effective deliverability. Thus, the expected average wellhead price this year is \$4.35 per thousand cubic feet in current dollars and \$4.27 next year, compared to \$2.95 last year.

NATURAL GAS OUTLOOK TO 2025

By 2025 total natural gas consumption is expected to increase to almost 35 trillion cubic feet (Tcf) or 26 percent of U.S. delivered energy consumption (Figure 1).*

Domestic gas production is expected to increase more slowly than consumption over the forecast, rising from 19.5 Tcf in 2001 to 26.8 Tcf in 2025. Growing production reflects increasing natural gas demand and is supported by rising wellhead gas prices, relatively abundant gas resources, and improvements in technologies, particularly for unconventional gas. In this forecast, economic conditions allow an Alas-

* Figures 1-10 have been retained in committee files.

kan pipeline to begin moving gas to the lower 48 States in 2021. The national average wellhead price is projected to reach \$3.90/Mcf in 2001 dollars by 2025.

The difference between consumption and production is made up by increasing use of imports throughout the forecast, particularly from liquefied natural gas (LNG), with a 2 Tcf increase expected over 2001 levels. By 2025 we expect expansion at the four existing terminals and construction of three new LNG terminals.

Consumption. Total natural gas demand in 2002, based on data reported through September, declined by 1.4 percent from the 2001 level. Overall weakness in the industrial sector, particularly in the first three quarters of the year, prevented a posting of positive growth. However, solid growth in natural gas demand is likely in 2003, especially if the industrial sector as a whole expands significantly as expected (Figure 2). In 2004, natural gas demand is projected to rise by an additional 2.4 percent as industrial demand continues its recovery from its 2002 lows.

Natural gas demand this winter (fourth quarter 2002 and first quarter 2003) is expected to be about 8 percent above last winter's demand, largely due to the fact that gas consumption-weighted heating degree-days will be 11 percent above year ago levels, provided February and March post normal temperatures.

U.S. natural gas consumption is expected to increase by 1.8 percent annually from 2001 through 2025. Gas consumption by electric generators is expected to double over the forecast, from 5.3 Tcf in 2001 to 10.6 Tcf in 2025, an average annual growth rate of 2.9 percent (Figure 3). Demand by electricity generators is expected to account for 30 percent of total natural gas consumption in 2025.

Most new electricity generation capacity is expected to be fueled by natural gas, so natural gas consumption in the electricity generation sector is projected to grow rapidly throughout the forecast as electricity consumption increases. Although average coal prices to electricity generators are projected to fall throughout the forecast, gas-fired generators are expected to have advantages over coal-fired generators, including lower capital costs, higher fuel efficiencies, shorter construction lead times, and lower emissions.

Historically the industrial sector, excluding lease and plant fuel, is the largest gas-consuming sector, with significant amounts of gas used in the bulk chemical and refining sectors. Industrial consumption is expected to increase by 3.4 Tcf over the forecast, driven primarily by macroeconomic growth. The chemical and metal durables sectors show the largest growth. Combined consumption in the residential and commercial sectors is projected to increase 2.6 Tcf from 2001 to 2025, driven by increasing population, healthy economic growth, and gradually rising prices in real terms. Natural gas remains the overwhelming choice for home heating throughout the forecast period, with the number of natural gas furnaces rising nearly 18 million.

Production. New data provided to EIA by the Minerals Management Service on natural gas production in the Federal Offshore Area of the Gulf of Mexico has resulted in a revised view of total domestic natural gas production for 2002. It is now estimated that U.S. dry natural gas production fell by 450 billion cubic feet (Bcf) (2.3 percent) in 2002 from the 2001 total. At least moderate production increases are expected in 2003 and 2004 as high natural gas prices and strong near-term demand pressures drive drilling activity and well completions to very robust levels over the period. Monthly domestic oil and gas lease revenues, which averaged about \$280 million in 2002, are expected to reach the \$400 million mark in 2003 and remain near that level in 2004.

The forecast estimate of total technically recoverable natural gas resources as of January 1, 2002, was 1,289 Tcf. These resource assessments come primarily from the assessments done by the U.S. Geological Survey for onshore regions and by the Mineral Management Service for the offshore.

These resources included 183 Tcf of proved reserves (9 years of consumption at 20 Tcf per year), 222 Tcf of inferred reserves, and 269 Tcf of undiscovered non-associated conventional resources. The largest category was unconventional resources at 445 Tcf, with most of that in tight sandstones at 71 percent. Other unconventional natural gas resources include gas shales and coalbed methane. Alaska gas (32 Tcf) and associated-dissolved natural gas in lower 48 crude oil reservoirs (137 Tcf) round out the resource.

Increased U.S. natural gas production through 2025 comes primarily from unconventional sources and from Alaska (Figures 4&5). Unconventional gas production increases by 4.1 Tcf over the forecast period more than any other source, largely because of expanded tight sands gas production in the Rocky Mountain region. Annual production from unconventional sources is expected to account for 36 percent of production in 2025, more than any other source, compared to 28 percent today.

An Alaska natural gas pipeline begins flowing gas to the lower 48 States in 2021, reaching 4.5 billion cubic feet (Bcf) per day in 2023, with further expansion begin-

ning in 2025 (Figure 5). Alaska also continues to provide for consumption in the State itself and for LNG exports to Japan. In 2025, total Alaskan gas production is projected to be 2.6 Tcf.

Conventional onshore non-associated production increases by 1.2 Tcf over the forecast, driven by technological improvements and rising natural gas prices. However, its share of total production declines from 34 percent in 2001 to 29 percent by 2025. Non-associated offshore production adds 560 Bcf, with increased drilling activity in deep waters; however, its share of total U.S. production declines from 22 percent in 2001 to 18 percent by 2025.

Associated dissolved production declines by 800 Bcf, consistent with a projected decline in crude oil production. Lower 48 associated-dissolved natural gas is projected to account for 8 percent of U.S. natural gas production in 2025, compared with 15 percent in 2001.

Depletion. A key question facing producers and policymakers today is whether natural gas resources in the mature onshore lower 48 States have been exploited to a point at which more rapid depletion rates eliminate the possibility of increasing or even maintaining current production levels at reasonable cost.

Depletion is a natural phenomenon that accompanies the development of all non-renewable resources. Physically, depletion is the progressive reduction of the overall volume of a resource over time as the resource is produced. In the petroleum industry, depletion may also more narrowly refer to the decline of production associated with a particular well, reservoir, or field. As existing wells, reservoirs, and fields are depleted, new resources must be developed to replace depleted reservoirs.

Depletion has been counterbalanced historically by improvements in technology that have allowed gas resources to be discovered more efficiently and developed less expensively, have extended the economic life of existing fields, and have allowed natural gas to be produced from resources that previously were too costly to develop. In AEO2003, technological progress for both conventional and unconventional recovery is expected to continue to enhance exploration, reduce costs, and improve production technology.

The depletion of conventional and unconventional natural gas resources is expected to continue over the projection period as the demand for natural gas increases significantly, continuing the trend that began in the mid-1990s. Nevertheless, with sustained wellhead prices generally over \$3 per thousand cubic feet (in 2001 dollars) and continued technological improvements, lower 48 non-associated gas production is expected to increase above current levels.

Imports. The difference between U.S. natural gas production and consumption is net imports. After growing by an expected 1.1 percent in 2002 due to high stocks and lower demand, natural gas net imports are expected to increase by 5.6 percent in 2003, which should relieve some of the potential pressure on the domestic market.

Net imports of natural gas, primarily from Canada, are projected to increase from 3.7 trillion cubic feet in 2001 to 7.8 trillion cubic feet in 2025 (Figure 6). Imports contributed 16 percent to total natural gas supply in 2001, compared to an expected 22 percent in 2025.

Almost half of the increase in U.S. imports is expected to come from LNG. Much of the increase comes from expansion at existing sites, but three additional facilities are also built to serve Florida and the Gulf States. The three new LNG facilities are expected to have a combined gas delivery rate of 2 billion cubic feet per day. By 2025, LNG imports are expected to equal 6 percent of total U.S. gas supply.

Growth in pipeline imports from Canada partly depends on the completion of the MacKenzie Delta pipeline. The MacKenzie Delta pipeline is expected to be completed in 2016 and expanded in 2023. The initial full flow rate into Alberta is assumed to be 1.5 Bcf per day. Additional imports will come from the Scotian Shelf in the offshore Atlantic. The forecast of Canadian imports largely depends on the ability of Canadian producers to economically produce and market their untapped unconventional resources, particularly coalbed methane. Net imports from Canada are projected to provide 15 percent of total U.S. supply in 2025 in the reference case, about the same as in 2001.

Although Mexico has a considerable natural gas resource base, trade with Mexico has consisted primarily of exports from the United States. Mexico is projected to go from a net importer of U.S. natural gas to a net exporter in 2020, as an LNG facility begins operating in Baja California, Mexico, in 2019, predominantly serving the California market. By 2025, the United States is expected to import about 300 billion cubic feet of natural gas from Mexico per year.

Pipelines. The opening of an Alaskan natural gas pipeline depends on competing natural gas prices in the lower 48 States and Canada, financing, and the degree of difficulty in siting and permitting the pipeline, among other factors. We have as-

sumed that lower 48 wellhead prices must be at least \$3.48 in 2001 dollars for 3 years before pipeline construction begins. Construction is assumed to take 4 years. The cost of the pipeline from Alaska to Alberta is assumed to be \$11.6 billion in 2002 dollars with a 7.5 percent discount rate, based on a study released last year by the owners of the North Slope gas.¹

While the pipeline is expected to begin operation in 2021 in the reference case, other assumptions—such as those about macroeconomic growth or the pace of technological change—affect the wellhead natural gas price and thus, the start date of the pipeline. In the slow oil and gas technology case, where the rate of technological improvement is 15 percent slower than the reference case, the flows on the Alaska pipeline start in 2019. In the high economic growth case, which assumes a GDP growth rate of 3.5 percent, the flow starts in 2018. Other factors which could affect the start of an Alaska pipeline are restrictions on carbon emissions and assumptions about the size of the natural gas resource base.

In all of these cases the MacKenzie Delta gas pipeline from MacKenzie Delta to Alberta starts 4 or 5 years before the Alaska pipeline. This \$3.6 billion pipeline is assumed to be triggered by a lower 48 States gas price of \$3.37. The MacKenzie Delta pipeline is assumed to have an initial flow of 1.5 Bcf per day, a planning period of 2 years, and a construction period of 3 years.

Additional interstate pipeline capacity will be required in the lower 48 States to bring Arctic gas to market, as well as to accommodate the growth in consumption over the forecast. While the flow of gas between primary regions in the lower 48 States is expected to increase by 40 percent from 2001 to 2025, the pipeline capacity necessary to transport this gas is only expected to increase by 26 percent. In order to do so, the annual utilization along these pipeline corridors will need to increase from 63 percent in 2001 to 70 percent by 2025. As electric generators go from a 25 percent share of end-use consumption in 2001 to a 33 percent share by 2025, the annual throughput on pipelines can expect to increase as well, since electric generators are primarily expected to add to either the base load requirements or the off-peak loads.

Wellhead Prices. Spot wellhead natural gas prices, which exploded in early 2001 in response to a winter demand surge amid very low inventory levels, retreated to low levels in early 2002 amid very weak winter demand and excess natural gas in storage (Figure 7). The very high short-term prices accelerated a natural gas drilling recovery that originated during the spring of 1999. However, a brewing pessimism in the natural gas market outlook, following a downturn in real GDP, the events of September 11, 2001, falling stock prices, and fallout from the collapse of Enron and other previously high-flying firms stripped some of the enthusiasm from the search for expanded natural gas resources, generating a sharp decline in natural gas-directed drilling by late 2001 and early 2002. Thus, the seeds of resurgence in natural gas prices were sown at the very time that excess supply appeared at its greatest. At the end of February 2002, natural gas in storage was 27 percent above the previous 5-year average; at the end of February 2003, storage is expected to fall 12 percent below the same average. Between those two times, spot prices are expected to post an increase of 151 percent.

Working natural gas in storage fell to about 1.52 trillion cubic feet at the end of January, or about 17 percent below the 5-year average and 35 percent below the year-ago level (Figure 8). January 2001 is the only time since 1977 that the January natural gas working storage level has been lower than this year, although similar end-of-January levels were seen in 1996, 1997, and 1999. However, the current level of gas in storage is relatively low, so full replenishment of working gas stocks in 2003 will be larger than average. The industry's capability to accommodate this requirement without considerable upward price pressure may not be as robust as in earlier years because of other supply factors, such as the possibility that new drilling may be less productive than in the past.

Despite the revised production estimates, a large (1.5 trillion cubic feet) discrepancy remains in the 2002 supply/demand balance. Much of this remaining imbalance relates to underestimated demand, most likely in the industrial sector.

The demand and supply data currently available to describe market developments in 2002 are somewhat contradictory in that the estimated demand growth from 2001 to 2002 appears to be too weak to coincide with the reduction in storage that demonstrably occurred. EIA's current estimate of production changes in 2002, based in part on recently received data from the Minerals Management service, indicates a reduction in new domestic supply of about 2.3 percent from 2001 levels. Other estimates suggest a decline of about 5 percent. Taking either of these estimates as

¹Additional costs would be incurred to transport this Alaskan gas from Alberta to the lower 48 States.

plausible, the remaining component of market changes that would be required to explain the shift in the gas storage position in the United States in 2002 involves stronger demand than is currently apparent in the data. Since the economy is expected to continue to recover in 2003, particularly in the gas-intensive industrial sector, and since continued tightness in world oil markets is expected to add to natural gas demand strength in the electric power and industrial sectors, continued strength in overall natural gas demand this year is expected.

In contrast to 2002, little or no incremental help from storage to meet new demand is possible in 2003, implying that consistent pressure on wellhead deliverability for natural gas is to be expected unless some of the demand strength is reduced. Therefore, the average wellhead price in 2003 is likely to exceed the 2002 average. The expected average wellhead price this year is \$4.35 per thousand cubic feet in current dollars compared to \$2.95 in 2002. Weather will, as always, play a key role in market developments for the rest of this year, but assuming normal weather through the forecast leads to the expectation of very strong natural gas spot and average wellhead prices next winter. Natural gas production growth in North America of between 2 and 3 percent, supplemented by increases in imports of liquefied natural gas, will probably be needed to maintain a reasonable balance in the domestic market through 2004. Solid increases in drilling appear likely for 2003 and are likely to provide the needed increase in productive capacity to stabilize the domestic natural gas market at wellhead prices between \$3.50 and \$4.50 per thousand cubic feet.

In the mid-term, gas prices are projected to move higher as technology improvements and new supply sources prove unable to completely offset the effects of resource depletion and increased demand (Figure 9).

Natural gas prices through 2025 are projected to increase in an uneven fashion as major new, large-volume supply projects temporarily depress prices when initially brought online. Examples include deep and ultra-deep offshore projects in the Gulf of Mexico, unconventional gas (tight sands, coalbed methane, shale), liquefied natural gas facilities (both the expansion of existing and development of new facilities), the MacKenzie Delta pipeline in Canada, and an Alaskan natural gas pipeline that delivers gas supplies to the lower 48 States.

In the reference case, average wellhead natural gas prices are expected to increase to \$3.90 per thousand cubic feet (2001 dollars) in 2025. The increase reflects rising demand for natural gas and the impact of the progression of discoveries from larger and more profitable fields to smaller, less economical ones. In current dollars, natural gas prices reach \$7 in 2025.

An uncertain outlook for the pace of economic growth is one of the key factors that could affect gas prices. Alternative cases were used to assess the sensitivity of the projections to changes in growth rates in population, labor force, and productivity. The high economic growth case assumes higher projected growth rates for population (1.0 percent per year), labor force (1.2 percent per year), and labor productivity (2.3 percent per year). With higher productivity gains, inflation and interest rates are projected to be lower than in the reference case, and economic output is projected to grow by 3.5 percent per year. GDP per capita is expected to grow by 2.5 percent per year, compared with 2.2 percent in the reference case. The low economic growth case assumes lower growth rates for population (0.6 percent per year), labor force (0.7 percent per year), and productivity (1.8 percent per year), resulting in higher projections for prices and interest rates and lower projections for industrial output growth. In the low growth case, economic output is projected to increase by 2.5 percent per year from 2001 through 2025, and growth in GDP per capita is projected to slow to 1.9 percent per year.

The 2025 wellhead price is projected to reach \$3.83 per thousand cubic feet in the low economic growth case and \$4.50 per thousand cubic feet in the high growth case. Technically recoverable natural gas resources are expected to be adequate to support the production increases projected in the three cases. As gas resources are depleted, however, wellhead prices are expected to increase, and a larger portion of U.S. natural gas consumption is projected to be met by foreign supplies and by production from Alaska.

End-use Prices. End use prices in 2003 are expected to be higher than last year due to colder weather and international events. January was about 9 percent colder than normal for the Northeast and 32 percent colder than January 2002 in that region. Ironically, the weather for the U.S. as a whole has been a bit warmer than normal in January, though there was a period of intense cold in the middle of the month. For the month of January, home heating fuel consumption was probably lighter than average, except in the Northeast. Spot prices for fuels surged, however, as crude oil and natural gas prices rose rapidly in the face of the Venezuelan oil export cutoff and sharply falling levels of domestic natural gas in storage. Some of

these commodity price changes are still working their way to the consumer level. Normal temperatures through the remainder of the heating season would imply a 28-percent increase in household natural gas heating expenditures for the winter season (October-March) compared to the 2001-2002 winter. Residential natural gas prices are projected to average \$9.04 per thousand cubic feet this year in current dollars and \$9.27 next year, compared to \$7.87 last year, \$9.63 in 2001, and \$7.77 in 2000.

Although residential price increases are expected to be significant, if the experience of the winter of 2000-2001 is an indication, industrial price increases could be even more significant, especially on a monthly basis. Two years ago some gas intensive industries, particularly ammonia and fertilizer producers, were particularly hard hit, with some plants shutting down production permanently. Industrial users who rely on spot market purchases for their gas and are unable to switch to an alternate fuel source face the greatest risk. Revival of the industrial sector may slow down at least until the heating season finishes and prices head downward.

End-use natural gas prices are expected to increase gradually starting in about 2005 as a result of increasing wellhead prices (Figure 10). A portion of the increase in wellhead prices is expected to be offset by a projected decline in average transmission and distribution margins as a larger proportion of the natural gas delivery infrastructure becomes fully depreciated. The average end-use price is expected to increase by 89 cents per thousand cubic feet between 2005 and 2025 (in constant 2001 dollars), compared with an increase of \$1.07 per thousand cubic feet in the average price of domestic and imported natural gas supplies over the same period. Part of this difference is attributable to an increasing share of natural gas sold to electric generators, the sector with the lowest prices.

CONCLUSION

Domestic natural gas prices are expected to remain high in 2003 and are at risk for significant volatility through at least the next 12 to 18 months. Strong underlying domestic demand for natural gas has been boosted by short-term or cyclical factors (including weather and oil market shifts), but expected strong levels of domestic natural gas drilling and development should provide increases in gross productive capability through 2004.

With the projected increases in both domestic gas production and imports through 2025, sufficient supplies are expected to be available to satisfy the growing demand for natural gas with wellhead price increases from \$2.92 in 2002 to \$3.90 in 2025 in 2001 dollars.

Thank you, Mr. Chairman and members of the Committee. I will be happy to answer any questions you may have.

The CHAIRMAN. Thank you very much. Your statement will be made a part of the record.

Let us go now with Mr. Welch.

STATEMENT OF DAVID WELCH, PRESIDENT, BP ALASKA-CANADA PIPELINES

Mr. WELCH. Mr. Chairman, members of the committee, I am David Welch, president of BP's Alaska-Canada Gas Pipelines. I am pleased to be here with you today to discuss the North American natural gas market, and commend you for holding this hearing of critical importance to our Nation. Today, I would like to discuss three things, current tight supply situation, how we got here, and where we might go.

What is the current situation? The North American gas market consumes roughly 25 trillion cubic feet of natural gas per year, which is equal to 68 billion cubic feet of natural gas per day. The North American market is in a state of transition.

Historically, the needs of consumers have been met by supply from existing basins, existing domestic basins, plus imports from Canada. As we examine the current market, we find that performance of supply sources is deteriorating. Most industry observers believe production is declining at a rate of about 5 percent per year,

and Canadian production has also started to decline. At the same time, demand for natural gas continues to grow. Consumers are choosing gas for economic and environmental reasons. More than 80 percent of the new electric power generating capacity utilizes natural gas.

Traditional sources of gas are unable to sustain production at current levels. The supply challenge is substantiated by several observations. First, U.S. production failed to respond significantly to the doubling of drilling activity that occurred in parts of 2000 and 2001. Secondly, Canadian production is also declining now, although Canadian drilling is high. Thirdly, in the current high-priced environment, drilling activity has not picked up to the degree that it did 2 years ago, and this is indicating fewer economic prospects are available, and it is probably the most telling sign of the supply situation in North America.

The result of these trends has been a sharp increase in prices and a very large drawdown of gas inventories in storage. The gap between supply from traditional sources and demand will grow with time. If we are to meet America's increasing need for clean-burning, efficient natural gas without very high prices and its incumbent demand destruction and loss of economic activity, then North America will need supply from all available continental sources as well as imported LNG.

How did we get here? There are a number of contributing factors that have led us to this situation. Access to the east and west coast and the eastern Gulf of Mexico is not permitted. There are also challenges that exist in some areas of the Western States. Gas deliverability from existing supply basins has not been as robust as has been expected. Most North American supply basins are very mature, and are suffering from production declines. The few new basins are either mostly oil, or have infrastructure and regulatory issues preventing rapid production growth.

Regulatory and fiscal terms have not been conducive to attract investment in frontier gas supply areas such as Alaska and Canada. LNG import facilities are limited in number, and currently contribute less than 1 percent of U.S. supply, so all these factors combine to create an ever-tightening supply situation that could have negative impacts to the overall economy. Government policy needs to lead the way to help expand the natural gas supply.

So what is the way forward? There is a general consensus that demand will continue to grow at 1 to 2 percent over the long run. North America will certainly continue to depend on current production from our traditional supply sources, but these alone will not be enough. New sources must also be brought to the market. Of the areas currently accessible, there are three which offer the greatest new supply potential, frontier gas from Alaska and Canada, gas from the Rocky Mountains, and LNG imports. However, in most cases, policy changes are needed to turn this potential into reality.

The Canadian frontier gas pipeline from the Mackenzie Delta—

The CHAIRMAN. Excuse me, Mr. Welch. Where—in those three, where does the offshore gas fit? Frontier, Rocky Mountain—

Mr. WELCH. Offshore gas is continuing to develop. Obviously, we are continuing to drill there. The big new source in offshore has

been the deep water Gulf of Mexico, which is proving to be mainly oil as opposed to gas. In fact, when the MPC did its study 3 years ago, that was a big source of growth, but now what we are finding as we have gotten more experience in the deep water is that the gas to oil ratios are about half of what was anticipated about 3 years ago.

The CHAIRMAN. So it does not belong, and these three stand on their own?

Mr. WELCH. These three stand on their own, yes sir. The Gulf of Mexico will continue to produce, but we think it will be more or less a stable contributor over the future.

Just a word on the Canadian frontier. The Mackenzie Delta contains roughly 10 trillion cubic feet of gas. The Canadian Government has already created a fiscal regime there that is conducive to investment and is actively seeking to expedite this infrastructure project which is underway. Alaska, I believe, is a critical element of future gas supplies. The frontier has 35 trillion cubic feet of gas known, and the U.S. Government is estimating over 100 trillion cubic feet to be discovered.

The major challenge to this supply is the unprecedented scale of the pipeline that is needed to bring this gas to market. The gas resource owners are considering a project that would bring 4 to 5 billion cubic feet per day into the market in the early part of the next decade. However, the fiscal terms of the Alaska gas project, as I have shown in my earlier chart, are tougher than any other significant growth options that we have.

This single opportunity in Alaska could materially improve the North American supply outlook, but without legislation, this project will not attract investment capital in the foreseeable future, and Alaska gas will not be able to achieve its potential as a major and long-term source of supply. Federal regulatory and fiscal legislation are needed now to help advance this project.

The Rocky Mountains could also play an important part in creating new gas supplies in this region. Additional pipeline capacity is required to deliver gas to the market, and there are also some regulatory issues which must be considered.

And finally, LNG could enhance the supply. Much of it could come from stable nearby countries such as Trinidad. A more robust LNG infrastructure here would foster access to a developing global market, helping us to moderate the great volatility in domestic prices seen in recent years.

If LNG is to make a material contribution, more terminals will be needed, and FERC has recently made a policy pronouncement that will encourage investment in LNG facilities, and we look forward to working with them to maturing LNG projects in the future.

In conclusion, the way forward involves policy decisions that we as a Nation need to make now to enhance opportunities for new gas supplies to come online in the future. The Government can make positive policy choices about access, about LNG terminal development, about frontier infrastructure development, and the industry will respond, resulting in increased supply. I sincerely believe that the natural gas market will need all of the North American gas available, as well as increased sources of LNG.

Again, thank you for the opportunity to present this, and I would be happy to answer any questions that might arise.

[The prepared statement of Mr. Welch follows:]

PREPARED STATEMENT OF DAVID WELCH, PRESIDENT, BP ALASKA-CANADA PIPELINES

Mr. Chairman and members of the Committee, I am David Welch, President of BP's Alaska-Canada Pipelines business and a former Regional President for BP based in Houston, Texas. On behalf of the over 40,000 BP employees in America, I am pleased to appear before you to discuss the North American natural gas market. I want to commend the Committee for holding this hearing on a matter that is of critical importance to the medium and long-term economic well being of the nation.

In my testimony today I would like to discuss three things: the current tight supply situation in the North American natural gas market, how we got where we are today and, the way forward.

First, I would like to provide some context about BP's production activities in North America. BP is the largest producer of oil and gas and one of the largest gas marketers in America. We are involved in most of the major producing basins in North America the Rocky Mountains, the San Juan, Alaska, Canada, the Gulf Coast, the outer continental shelf, the deep water Gulf of Mexico and we produce roughly 4 billion cubic feet of natural gas per day (BCF/d). BP invested \$1.5 billion in North American gas development last year alone. I mention these facts to give you a sense of the scale of our operations and our experience with the North American natural gas market.

WHAT IS THE CURRENT SITUATION?

The North American natural gas market is in a state of transition. Historically, the needs of gas consumers have been largely met by traditional supply sources from existing US basins plus imports from Canada. Today, the North American market consumes roughly 25 trillion cubic feet of natural gas per year (TCF/y) or 68 BCF/d. As we examine the current market, we find the performance of traditional supply sources deteriorating. Most industry observers believe that US gas production is declining at a rate of five percent per year and Canadian production is also in decline.

At the same time production is falling, demand for natural gas is growing. We expect demand to continue to grow at roughly 1-2% per annum. Consumers are choosing gas for both economic and environmental reasons. New power generation from natural gas costs less (at long run historical prices), requires 50% less capital for construction and, has 50% lower greenhouse gas emissions than alternative fuels such as coal or oil. As a result, more than eighty percent of new electric power generating capacity utilizes natural gas.

Traditional sources of North American supply are severely challenged to sustain production at current levels. The supply challenge is substantiated by several observations:

- U.S. production failed to respond appreciably to the doubling of drilling activity that occurred during parts of 2000 and 2001. In fact, current production appears to be on a slightly steeper decline than observed prior to that activity ramp-up.
- Canadian production is experiencing its first decline since 1986-87 after seeing a similar activity increase during that period.
- Current drilling activity is not responding, as significantly as it did two years ago, to the recent high price environment, suggesting that there are real limitations on industry's capacity to continually regenerate its drilling portfolio. This is probably the most telling sign of the gas supply situation in North America.

These observations are a reflection of the maturity of our traditional supply sources. Prospects for offsetting the declining production trend from these regions requires new sources of supply. Less mature areas such as the Deepwater Gulf of Mexico and the Eastern coast of Canada will help, but development in these areas takes years to complete. The best-case scenario for traditional North American supply regions is a flat to slightly declining production outlook. So, while demand is expected to continue growing, we believe traditional supplies will not keep pace.

The result of these trends has been a sharp upward move in prices and increased price volatility. Prices have gone from \$2 to \$10, back to \$2 and now up to \$6 (at Henry Hub; NY has been above \$20 this winter). This volatility is not in anyone's

best interest. Neither producers nor consumers can comfortably invest when they are that uncertain about the future.

This tells us is that absent the introduction of new supplies, a gap between supply from traditional sources and demand will grow with time if we are to meet America's increasing need for efficient, clean-burning natural gas.

Of course the market will respond to fill this gap with some combination of price induced fuel switching—to coal or imported oil. Another response is demand destruction—with its concurrent loss of economic activity. In our opinion, to avoid these undesirable outcomes North America will need supply from all available sources; from increased production in the traditional producing basins, from frontier gas like the Alaskan and Canadian Arctic, and from additional imported LNG.

HOW DID WE GET HERE?

As is always the case, there are a number of contributing factors that have led us to the situation we find ourselves in today. Clearly access policy is an important factor—access to the East and West Coast is not permitted and challenges also exist in the onshore areas of the Western states.

Secondly, we now understand that the gas deliverability from existing supply basins is not as robust as had been expected. The 1999 National Petroleum Council natural gas study presented what now appears to be an overly optimistic view of supply. For example, gas-oil ratios factored into the study for the deepwater Gulf of Mexico were twice as large as is actually being experienced. Fortunately, an updated study has been requested by the Secretary of Energy and a large, diverse group of producers, consumers and, marketers of natural gas are involved. The study is expected to be completed around September but we do not anticipate the findings to differ materially from my comments here today.

Other factors contributing to our current supply situation include pipeline capacity constraints for producers in the West. In many of these areas, pipeline take-away capacity limits the pace of exploration and development. The fact is, industry has responded in areas where they have been able to access new production. However, the ability to deliver these large new volumes of gas to the market is restricted. The industry has also responded by offering shipping commitments so that pipeline investors have the confidence to build the needed transportation capacity. Sadly however, due to the recent turmoil in the energy markets there are fewer companies in the regulated transportation industry and investment capital is expensive and hard to find. Thankfully, these issues are being dealt with by the FERC in a judicious fashion. But there are no overnight solutions; it will take time to build the infrastructure.

As a result of the tightening supply and demand picture, gas storage inventories have been drawn down sharply to keep the market in balance. US natural gas inventories are currently 868 BCF below last year's level (as of 2/14/03), and 436 BCF below the 5-year average. Including Canadian data, North American stocks are more than 1 TCF below last year's level.

Inventories are typically drawn down during the peak winter heating season and refilled during the summer; current trends, however, suggest this year's summer refill may be disappointing, which would leave the market vulnerable to higher prices again next winter. While low inventories may not be a physical problem for the market until next winter, the anticipation of a tight situation will be reflected in prices immediately.

Unlike the oil market, consumers in the US currently have access to limited number of natural gas supply sources. When the oil market is tight, we have access to supplies from around the globe. This is not the case for natural gas—we only have access to existing basins on the continent and a very limited number of LNG receiving facilities. Mexico is also in need of additional supply sources and will be competing for new supply. All of these factors combined (declining supplies from traditional sources, access and capacity limitations, coupled with increasing demand) create an ever-tightening supply situation that could, if it is left to persist, have negative impacts to the overall economy. Government policy needs to lead the way to help expand natural gas supply.

WHAT IS THE WAY FORWARD?

North Americans are currently consuming roughly 25 TCF/y and 68 BCF/d. There is general consensus that demand for clean burning natural gas will continue to grow at 1-2% per annum over the long run. This means that North America will continue to depend on production from our traditional supply sources, but that alone will not be enough. Within about 10-15 years time, new sources in the neighborhood of 15 BCF/d must also be brought to the market if demand is to be satisfied. We

believe that of the areas currently accessible, there are three, which offer good new supply potential: frontier gas from Alaska and Canada; Rocky Mountain gas, and LNG imports. However, in most cases, policy changes are needed to turn this potential into reality.

The MacKenzie Valley project is in development to bring 1-1.5 BCF/d of gas from the Canadian Arctic to the market. This project is well underway; with some of its developers indicating first gas as soon as 2008. We support this project and the Canadian government is expediting its development.

In Alaska, North America has 35 TCF of known resource and, according to the MMS, an upside potential of a further 155 TCF. Alaska's North Slope is a world-class gas resource. The major challenge is the unprecedented scale of the pipeline project to transport the gas due to its distance from the market. The principal owners of this resource are considering a project that could deliver 4-5 BCF/d in the early part of the next decade. This single opportunity could materially improve the tenuous North American supply outlook with wide ranging benefits for the economy, the environment and energy security. However, without government policy changes related to regulatory and fiscal structures, this project cannot attract investment as project risks outweigh prospective rewards.

The Rocky Mountain region can also play an important part in creating new gas supplies, however, much of its resource is non-conventional thus carries higher production costs. The entire region needs additional pipeline capacity to deliver gas to markets. There are also a number of federal regulatory issues including, public land access and air quality, which must be taken into account. Incremental near-term supply growth from this area can be helped by government action on these critical issues.

LNG could provide more new supply over the near to intermediate term (2003-10) and much of it could come from stable, nearby countries such as Trinidad. A more robust LNG infrastructure here would foster greater access to a developing global market, helping to moderate the wild fluctuations in domestic prices seen in recent years. However, we must recognize that LNG is currently less than 1% of the US market. There are four terminals in use today. If LNG is to make a material contribution to US natural gas supply, more terminals will be needed. FERC recently made a policy pronouncement that will encourage investments in new facilities and we look forward to working with them to implement their policy decision.

CONCLUSION

Clearly, the way forward with regard to the North American natural gas market involves policy decisions that we as a nation will need to make now so that we can begin to address what is clearly an issue with long-term consequences. You can make policy choices about access, about LNG re-gasification terminal development, and about frontier basin development, and the industry will respond. We believe the market will need all of the North American gas available, along with additional sources of LNG.

We believe the right policy choices are those that:

- Enhance U.S. energy and national security;
- Promote economic activity, job creation and government revenues;
- Provide consumers with reasonably priced energy to maintain a healthy economy;
- Stimulate non-conventional supplies;
- Continue to promote efficient and environmentally friendly energy use.

Promoting the further development of a North American gas industry can meet all of these policy needs.

Again, thank you for the opportunity to present these views. I would be happy to answer any questions.

The CHAIRMAN. Thank you very much.
Mr. Rattie.

STATEMENT OF KEITH RATTIE, PRESIDENT AND CEO, QUESTAR CORPORATION

Mr. RATTIE. Thank you, Mr. Chairman. My name is Keith Rattie. I am president and chief executive officer of Questar Corporation, based in Salt Lake City. I will try to hit a few points that have not been made by my colleagues on the panel today, and hope we will see some interesting dialogue during the Q&A.

This winter, as I think everyone in the room knows, America is getting a wake-up call. Simply put, we have a natural gas supply problem, and I have three objectives this afternoon. First, I will briefly explain why prices are higher this winter, why they have jumped this winter, second, I will describe the magnitude of the natural gas supply challenge facing the country over the next 2 decades, and then third, I will recommend several steps that Congress can take over the long-term to help us get out of this mess.

Now, I mentioned wake-up call. We got our first wake-up call a couple of years ago, when a confluence of events: a cold winter, hot summer, and a surging economy led to a sudden jump in demand that sent the gas prices soaring, but just as quickly, drilling activity in 2001 boomed, supply grew, albeit slightly, demand fell, and gas prices retreated, and that is just what you expect from a competitive deregulated market.

Today, natural gas prices are back at winter 2001 levels because demand is up and supply is down. Demand is up in part because we are having a normal winter. Now, I know most of the folks who live here in the East probably take exception to my characterization of this winter as normal, but if you look at trends across the entire country, it actually is that.

In fact, the reality is that warmer than normal weather in 4 of the last 5 years has masked the supply problem. Consumers are very fortunate we have not had a colder-than-normal winter this year, because supply is down. U.S. natural gas production is down this year by some estimates 4 percent lower in the fourth quarter of 2002 than it was in the fourth quarter of 2001 and, as other panelists have noted, that is in spite of a jump in drilling activity in recent years.

The sobering reality is that we are drilling a lot more wells today than we were 5 years ago, but supply is still flat, or down. U.S. producers are running on an accelerating treadmill, running harder just to keep production flat, and for reasons that are partly due to technology and partly due to the maturing of the accessible gas resource base, the typical well drilled today will decline at a faster rate than a typical well drilled a decade ago. Moreover, because half of this country's current natural gas supply is coming from wells that have been drilled in the past 5 years, this decline trend is likely to continue.

The implications are even more sobering, when we consider what is expected to happen to demand over the next 2 decades, and my colleague from the EIA has already commented on that. I will just note the EIA is predicting that U.S. natural gas consumption will increase to about 35 trillion cubic feet in the year 2025 from 2.7 trillion cubic feet in 2001.

Now, let me put a 35 tcf U.S. gas market in 2025 in perspective. 35 tcf implies a jump in average daily gas supply from about 60 bcf per day today to about 95 bcf per day in 2025, a 35 bcf per day increase in deliverability, and let me put that in perspective.

Today, current production from the entire Gulf of Mexico is only about 14 bcf a day. As other colleagues have mentioned, increased imports of LNG and new pipelines from Alaska and the Mackenzie Delta, we need both of them. Those are clearly needed, and I think everybody in the industry supports their development, but the ines-

capable conclusion is that most of the incremental gas supplies needed to serve a growing U.S. market must come from the U.S. lower 48, and that implies that the burden of delivering a 50 percent increase in gas supply over the next 20 to 25 years will fall primarily on the shoulders of U.S. independents.

Now, if there is one point that we make today, and if it is the only point that is taken away from this, I think this is the most important point. We have to be clear, the problem is not with the resource base. North America is blessed with abundant natural gas reserves. Most of us in the industry believe that the resource base is more than adequate to supply a 35 tcf market in 20 to 25 years, and advances in technology have demonstrated that over the last couple of decades. Indeed, technology will some day unlock vast amounts of natural gas trapped as hydrates beneath the ocean floor and the Arctic tundra.

Some scientists believe that there is enough potential in gas hydrates to supply the U.S. market for at least 100 years, so the bottom line is, we are not running out of natural gas. We are not running out of places to look for natural gas.

We are, however, running out of places where we are allowed to develop natural gas, and the truth that I think must be confronted now is that, as a matter of policy, this country has chosen not to develop much of its natural gas resource base, and I suspect that many of the 65 million American households that depend on natural gas for heat are unaware that this choice has been made on their behalf.

By most estimates, 30 to 40 percent of our potential natural gas resource base is either off limits, or only open to development under highly restricted conditions. Onerous laws and regulations prohibit exploration in areas where there is huge potential for new supply. Permitting has become next to impossible for new pipelines and LNG import terminals.

Now, opponents of domestic gas development will cite environmental concerns. I think you will find that many of these concerns are exaggerated. New technology has allowed the industry to dramatically reduce the footprint of its activities. The argument that drilling drives wildlife to extinction is another popular fiction. To the contrary, in most cases wildlife adapts and thrives in harmony with energy development.

It is also time for America to rethink its fear about exploring and producing gas in our offshore basins. Now, clearly, offshore platforms have an impact on the environment, but offshore platforms do not hurt the environment. Natural gas spills do not happen, and sub-sea wells can reduce or eliminate the need for offshore platforms in areas where visual impacts are the concern.

So the key question for policymakers is this: Can we afford policies that leave vast amounts of our domestic natural gas reserves untested and undeveloped? If the consequences of these policies were understood, I believe most Americans would answer no.

So what do we do? In the short run, the only sensible thing the Congress can do is to let the market work and, indeed, it already is. High prices have led to a sharp increase in drilling activity in the last couple of months. High prices are also causing conserva-

tion. You can bet that increased supply and lower demand will cause lower prices later this year.

But while the market takes care of the problem in the short-term, there is much the Congress can to help gas supply keep pace with demand longer-term. And I think first and foremost, what we need is leadership. Congress can help forge a national consensus that natural gas is abundant, that natural gas development is good for the economy, good for the environment, and good for society.

Second, Congress should continue policies that have worked in the past, and those have been mentioned already. A decade ago, section 29 tax credits stimulated development of unconventional gas such as the San Juan Basin and the Powder River Basin cold bed methane plays. In 1995, Congress set in motion what may be the most important E&P play of the last decade by providing graduated royalty relief for production from Federal leases in deep water. Today, more than a quarter of our domestic gas production results from these past policy successes.

Now, mindful of what has worked in the past, Congress can help by reestablishing section 29-type tax credits. Congress should also make adjustments to the tax code to address the misallocation of value that was described by one of the panelists earlier.

Third, and most important, it is time to allow access to high potential Federal land in the Rockies, off the east and west coasts, and in the eastern Gulf of Mexico. Again, the industry has proven that our energy resources can be developed without harming wildlife or the environment.

Fourth, policymakers can help get the pipeline industry back on its feet and remove barriers to pipeline construction. INGAA estimates that between \$60 and \$70 million in new capital investment in pipelines will be required over the next 12 to 15 years to keep pace with demand. A financially sound pipeline industry is a prerequisite for this investment, and the pipeline industry today is anything but financially healthy. Uncertainty about future regulatory policy threatens capital formation at a critical time.

Fifth, Congress should fund collaborative research by agencies such as the Gas Technology Institute and others. R&D spending by energy companies has plummeted over the past decade, and what remains is more focused on incremental improvements and not breakthroughs. Collaborative research is both vital and cost-effective.

Mr. Chairman, energy policy issues are complex. There are many stakeholders in the debate. Each stakeholder has a long list of things they would like Congress to do. Many of these are worthwhile, but we cannot let the need for action on gas supply get lost in the debate over less urgent matters, and so we applaud your focus on the critical issue of gas supply here today, and I will be pleased to answer questions on this later.

Thank you.

[The prepared statement of Mr. Rattie follows:]

PREPARED STATEMENT OF KEITH RATTIE, PRESIDENT & CEO, QUESTAR CORPORATION

Good afternoon. Mr. Chairman, members of Congress, it's my privilege to appear before you today. My name is Keith Rattie. I'm the President and Chief Executive Officer of Questar Corporation. Questar is an integrated natural gas company headquartered in Salt Lake City. We have significant businesses in each part of the

natural gas value chain—upstream exploration and production, interstate pipelines, and downstream retail gas distribution. We operate primarily in the Rockies and the Midcontinent. We're one of the fastest growing gas producers in the country. Our interstate pipeline companies move gas from the Rockies to energy markets in the West. Our retail gas distribution company serves 750,000 homes and businesses in Utah, Wyoming and Idaho.

Yesterday, natural gas prices shot above \$8 per mcf at the Henry Hub for the first time since 2001. Spot prices in New York at times have exceeded \$20. This winter, America's getting another wake-up call. Simply put, we have a natural gas supply problem.

I have three objectives this afternoon. First, I'll briefly explain why natural gas prices have jumped this winter. Second, I'll describe the magnitude of the natural gas supply challenge facing this country over the next two decades. Third, I'll recommend several steps that Congress can take to help bring natural gas prices down long-term.

America got its first wake-up call on natural gas supply two years ago when a confluence of events—cold winter, hot summer and a surging economy—created the so-called “perfect storm.” This jump in demand sent gas prices soaring. Drilling boomed, supply grew (slightly), demand fell, and gas prices retreated—just what you'd expect from a competitive, deregulated natural gas market. But then falling natural gas prices predictably led to a slowdown in drilling. The industry drilled 30% fewer gas wells in 2002 than in 2001. This downturn in drilling in 2002 set the stage for another run-up in prices this winter.

Today, natural gas prices are back at winter 2001 levels because demand is up and supply is down. Demand is up in part because we're having a normal winter. Now, I know that folks who live here in the East will take exception to my characterization of this winter as “normal”. This winter may seem colder than normal, but that may be because four of the past five winters have been warmer than normal. Even the winter of 2001 was normal by historical standards. Consumers are fortunate we haven't had a colder than normal winter.

High oil prices are also propping up natural gas prices this winter. In certain markets, notably the U.S. Northeast, gas competes with oil products. Unlike in 2001, when high gas prices led to the substitution of oil for gas, substitution hasn't kicked in as quickly as it did two years ago.

Meanwhile, while demand is up, U.S. natural gas production in the fourth quarter of 2002 was down about 4% from the fourth quarter of 2001. Indeed, U.S. natural gas production today is lower than it was five years ago—despite a big jump in drilling in recent years.

In 2001, in response to high prices, the industry drilled about 22,000 natural gas wells, nearly double the number of wells drilled in each of the four prior years. In 2002, in response to falling prices, the industry drilled about 16,000 gas wells, 30% fewer than in the prior year. However, even though drilling activity declined in 2002, the industry still drilled and completed about 50% more wells last year than the average from 1995-2000.

The sobering reality is that we're drilling a lot more wells today than we were five years ago, but supply is still down. U.S. gas producers are on an accelerating treadmill, running harder trying to stay in place. For reasons that are partly due to technology, and partly due to the maturing of the accessible natural gas resource base, a typical well drilled today will decline at a faster rate than a typical well drilled a decade ago. Moreover, because up to half of this country's current natural gas supply is coming from wells that have been drilled in the past five years, this decline trend is likely to continue.

Before we can grow gas supply, we first have to replace decline. The U.S. natural gas decline rate will range from 26-28 % this year. In practical terms, if we stopped all drilling today, one year from now U.S. natural gas production would be 26-28% lower than it is today. Accelerating decline helps explain why U.S. gas deliverability has been stuck in the 52-54 billion cubic feet (bcf) per day range for the past eight years—again, despite an increase in gas-directed drilling.

The implications are even more sobering when we consider what's expected to happen to demand over the next two decades.

The EIA, in its recent *Annual Energy Outlook 2003*, predicts that U.S. natural gas consumption will increase at an average rate of 1.8% per year to about 35 trillion cubic feet (tcf) per year in 2025, from 22.7 tcf in 2001. Much of this growth in natural gas demand will occur in the electricity market. In fact, the U.S. now has over 150,000 megawatts (MW) of new gas-fired power plants on line that did not exist in the summer of 1999—the equivalent of about 70 Diablo Canyon nuclear power plants.

Let's put the EIA's projected 35 tcf U.S. gas market into perspective. 35 tcf implies a jump in average daily gas supply from about 60 bcf per day today to about 95 bcf per day in 2025—a 35 bcf per-day increase in deliverability. To put a 35 bcf per day increase into perspective, current production from the entire Gulf of Mexico is only about 14 bcf per day, and imports from Canada are about 10 bcf per day.

The EIA predicts that increased LNG imports and new pipelines from Alaska and the Canada Mackenzie Delta will help close the supply gap over the next two decades. Clearly, we need these new supplies. There's a lot of gas in northern Alaska and northern Canada, and there are enormous amounts of stranded gas around the world that can be brought to the U.S. on LNG ships. But again, let's put this into perspective. About ten new LNG import terminals have been proposed, each with capacities of about 1 bcf per day. Even if all of these LNG terminals get built, LNG would only supply about 10-15% of a 35 tcf market. Given the intense "not on our beach" opposition to siting new LNG terminals, a major supply impact from LNG seems a tall order.

The proposed pipelines from Prudhoe Bay and the Mackenzie Delta, which are at least five years from reality, together might eventually deliver up to 8 bcf per day—just 8% of a 95 bcf per day market.

The inescapable conclusion is that most of the incremental gas supplies needed to serve a growing U.S. market must come from the U.S. lower-48. And, that implies that the burden of delivering a 50% increase in gas supply over the next 20-25 years will fall primarily on the shoulders of U.S. independents. This is a key point for policy makers. Except for Alaska and the deepwater Gulf of Mexico—which incidentally is primarily an oil play, not a natural gas play—the majors have essentially thrown in the towel in the U.S. They've taken their know-how and their capital overseas to drill in places like Angola, Kazakhstan, and Nigeria. With the U.S. gas market set to boom, U.S. independents are being called upon to perform a large and growing job on behalf of U.S. prosperity and energy security.

It's a tall order, even more so when one considers the barriers we throw in the way of domestic natural gas development. Frankly, unless we remove these barriers, there's no chance the industry can supply a 35-tcf market in 2025.

Now, let's be clear that the problem is not with the resource base. North America is blessed with abundant natural gas reserves. The National Petroleum Council (NPC) study in 1999 did a good job describing North American gas potential. Most of us in the industry believe that the resource base is more than adequate to supply a 30-35 tcf market in 20-25 years.

Last year, the RAND Corp and the Wilderness Society issued studies challenging the NPC estimates. Their arguments are fundamentally flawed, and should be ignored by policymakers. In fact, advances in technology—downplayed in the RAND and Wilderness society studies—have enabled the industry to significantly expand the potential resource base over the past decade. A growing percentage of U.S. gas supply today comes from plays that didn't exist a decade ago. Contrary to the impression one gets from images of dirty, sweaty roughnecks working the floor of a drilling derrick, this industry is a high tech industry. When it comes to innovation, the American oil and gas industry leads the rest of the world by a wide and growing margin. New technology has reduced both the costs and risk of gas exploration. New technology allows the industry to drill deeper, maintain or increase production in existing fields, and develop unconventional gas that only a few years ago was considered uneconomic.

Indeed, technology will someday unlock vast amounts of natural gas trapped as hydrates beneath the ocean floor and the Arctic tundra. Some scientists believe that there is enough potential in gas hydrates to supply the U.S. market for at least 100 years. In fact, next month industry will drill the first methane hydrate well on the frozen tundra of Alaska's North Slope.

The bottom line: we're not running out of natural gas, and we're not running out of places to look for natural gas. However, we are running out of places where we are allowed to look for gas. The truth that must be confronted now is that, as a matter of policy, this country has chosen not to develop much of its natural gas resource base.

I suspect that many of the 65 million American households that depend on natural gas for heat are unaware that this choice has been made on their behalf.

By many estimates, 30-40% of our potential natural gas resource base is either off limits or only open to development under highly restricted conditions. Onerous laws and regulations prohibit exploration in areas where there is huge potential for new supplies. Permitting has become next to impossible for new pipelines and LNG import terminals.

Opponents of domestic gas development often exaggerate environmental concerns. Yes, drilling disturbs the surface, but not much, and not for long. Among the many

technological advances made by the industry are improved methods of restoring land after the drilling rig has done its thing and left. Technologies developed over the past decade such as horizontal drilling greatly reduce the footprint of drilling activities.

The argument that drilling drives wildlife to extinction is pure fiction. To the contrary, in most cases wildlife adapts and thrives in harmony with energy development.

It's also time for America to rethink its fear about exploring and producing gas in our offshore basins. Clearly, offshore platforms have an impact on the environment. But there is no evidence that offshore platforms hurt the environment. Natural gas spills do not happen. And, for the folks who live along our coasts who don't want to see a distant offshore platform on the ocean horizon, the industry has a solution. Subsea wells can reduce or eliminate the need for offshore platforms.

The irony, of course, is that by choosing not to develop our most environmentally benign fuel, we're burning more coal and running our aging nuclear plants harder than ever.

The key question for policymakers is this: can we afford policies that leave vast amounts of our domestic natural gas reserves untested and undeveloped? If the consequences of these policies were understood, I believe most Americans would answer "no."

If history is any guide, angry consumers will soon be calling on Congress to "do something" about high natural gas prices.

In the short run, the only sensible thing Congress can do is to let the market work. Indeed, it already is. High prices have led to a sharp increase in drilling activity in the past couple of months. High prices also encourage conservation. Increased supply and lower demand will cause prices to fall later this year.

While the market takes care of the problem in the short term, in the intermediate and longer term, there is much that Congress can do to help gas supply keep pace with demand.

First, we need leadership. Congress can help forge a national consensus that natural gas is abundant, and that natural gas development is good for our economy, good for the environment, and good for society.

Second, Congress should continue policies that have worked in the past. A decade ago Section 29 tax credits stimulated development of unconventional gas such as the San Juan basin and Powder River basin coal-bed methane plays. In 1995 Congress set in motion the most important E&P play of the past decade, by providing graduated royalty relief for production from federal leases in deep water. Today, more than one-fourth of our domestic gas production results from these past policy successes.

Mindful of what has worked in the past, Congress should re-establish Section 29-type tax credits for unconventional gas. These credits help producers stay the course with riskier and more costly development in the face of extreme gas price volatility. To prevent a windfall to producers, these credits should be phased out as prices rise, and should kick-in when prices drop. Congress should also adjust the tax code to help mitigate the adverse impact that accelerating decline has on the economics of drilling. The tax code should allow current-year expensing of geological and geophysical costs, eliminate the net income limitation on percentage depletion for marginal wells, eliminate the 65% net taxable income limit on percentage depletion, and eliminate parts of the alternative minimum tax that undermine the incentive for drilling.

These policies are not, as some will argue, a major giveaway by taxpayers. They are sensible investments in domestic natural gas supply. Indeed, the incremental tax revenues that will result from new gas supply will far exceed the tax benefit realized by producers.

Third—and most important—it's time to allow access to high-potential federal land in the Rockies, off the East and West coasts, and in the eastern Gulf of Mexico. The industry has proven that our energy resources can be developed without harming the environment. Those who oppose drilling on federal lands exploit conflicts in federal policies to obstruct development. One example: millions of acres of federal lands in the West are being managed by the BLM as if Congress has designated them as "wilderness" under the 1964 Wilderness Act, even though Congress has not made such a designation.

Opponents of domestic energy development offer no viable alternative, only fantasies about a planet free from the scourge of hydrocarbon fuels. They prevail by intimidating lawmakers. If they continue to prevail, American prosperity may be at risk.

Fourth, policymakers can help get the pipeline industry back on its feet and remove the barriers to pipeline construction. INGAA estimates that \$60-70 billion in

new pipeline investment will be required over the next 12-15 years to keep pace with demand. A financially sound pipeline industry is a prerequisite for this investment, and the pipeline industry today is anything but financially healthy. Uncertainty about future regulatory policy threatens capital formation at a critical time. Congress should encourage the FERC to wrap up its investigation of the California energy crisis and Enron, decide what changes in policy are necessary, make those changes, and then help the industry move on.

To be sure, the shenanigans of Enron and others are deplorable, but they are in the past. The marketplace has rendered the justice everyone wants. Nothing in the frenzy of proposed new regulations can even come close to matching the power of the marketplace to root out fraud and deter bad behavior. The vast majority of energy companies conduct business with honesty, integrity, and transparency, and they should not be punished for the misdeeds of a few. It's time to close this sad chapter in the history of American business, and move on.

As is the case with drilling, opponents of pipeline construction exploit conflicts in existing laws and overlapping jurisdiction to block pipeline projects. For example, the Coastal Zone Management Act (CZMA) has been invoked by states to block FERC-approved natural gas pipeline projects. Congress should reaffirm the FERC's lead role with respect to interstate pipelines.

Fifth, Congress should fund collaborative research by the Gas Technology Institute (GTI) and others. R&D spending by energy companies has plummeted over the past decade, and what remains is more focused on incremental improvements, not breakthroughs. Collaborative research is both vital, and cost effective. GTI's financial well being is threatened by the expiration of FERC funding in the next couple years. The industry needs the GTI; indeed, America needs GTI.

Mr. Chairman, energy policy issues are complex. The many stakeholders in this debate have long lists of things they'd like Congress to do. Many of these are worthwhile, but we can't let the need for action on gas supply get lost in the debate over less urgent matters. We applaud your focus on this critical issue. I will now be pleased to answer your questions.

The CHAIRMAN. I want to thank you very much for your testimony.

Mr. Best.

**STATEMENT OF ROBERT W. BEST, CHAIRMAN,
ATMOS ENERGY CORPORATION, DALLAS, TX**

Mr. BEST. Thank you, Mr. Chairman. My name is Bob Best, chairman of Atmos Energy Corporation of Dallas, Texas, and vice chairman for the 2002-03 year of the American Gas Association.

Atmos Energy serves 1.7 million customers in 12 States, with our largest properties being in Louisiana, Texas, Colorado, Missouri, Kentucky, Tennessee, Georgia, Mississippi, and Kansas. We serve at retail. We have no E&P properties, or we are not in the trading business. The American Gas Association is composed of 191 gas distribution companies whose members deliver 83 percent of the gas used in this country to residential, commercial, industrial, and public authority customers. Natural gas, as you all know, provides 25 percent of the energy used in this country.

In my oral presentation, I just want to make five succinct points. The first is that the interests of the local distribution companies and the consumer are uniquely aligned. We do not make money when gas prices go higher. We pass those prices through one-for-one. We are a delivery system. We have no self-interest in gas prices being higher. In fact, just the contrary. As Senator Bingaman mentioned, when prices go high, it dampens our demand, it upsets our customers, and upsets our regulators. What we want is adequate supply at reasonable prices. We believe that the consumer needs to be heard in this debate, and that we are that link to the consumer.

Secondly, as other speakers today have noted, natural gas is abundant throughout North America. 99 percent of the natural gas supplied to U.S. consumers originates in Canada or the United States. We do have a strong resource base. We are not dependent on imports to meet our natural gas needs, but our economy, as much as some people might want it to be, is going to be a fossil-fuel-based economy for years to come whether we like it or not. We certainly need to work on other forms of energy and conservation, but our economy will be driven by fossil fuels for the foreseeable future.

No. 3, natural gas is by far the superior fossil fuel from an environmental standpoint. We believe that natural gas is the fuel of the future. Because of its superior environmental qualities, demand is projected to grow for natural gas more than 50 percent over the next 10 to 15 years, going from 22 tcf to as high as 35 tcf.

Almost all new electric generating facilities built in this country today for environmental reasons are using natural gas.

No. 4, this demand will not be met and the environmental and economic benefits will not be realized for our country unless Congress passes a comprehensive energy bill which provides additional incentives and greater access for natural gas exploration and production.

We have a very simple problem. We must increase supply. We have a free market, so as supply goes up, even as demand goes up, it puts pressure on prices, and that is what we need, because our people cannot pay the prices our customers are seeing in the marketplace today.

What are our alternatives? They are to use other fuels. But these fuels do not come close to providing the economic benefits that gas does, or they will only increase our dependence on foreign countries.

No. 5, we are not here today to tell you that the sky is falling. We are not people that create gloom and doom. We continue to be optimistic about the future, but we do think there needs to be a sense of urgency about this issue.

Supply and demand has tightened, there is no question about it. The result has been higher prices and greater price volatility. The bubble is gone. The bubble is gone.

In conclusion, assuring long-term adequate natural gas supply will lead to reasonable prices for consumers, it will dampen the unacceptable volatility of wholesale natural gas markets, it will keep the economy growing, it will help protect the environment, and it will eliminate the need to rely on other, less-desirable fuels.

That concludes my remarks, Mr. Chairman. I would like to place in the record, if I might, along with my written comments, a document entitled, From the Ground Up, America's Natural Gas Supply Challenge, which was put out several months ago by the American Gas Association.

Thank you.

[The prepared statement of Mr. Best follows:]

PREPARED STATEMENT OF ROBERT W. BEST, CHAIRMAN,
ATMOS ENERGY CORPORATION, DALLAS, TX

EXECUTIVE SUMMARY

The American Gas Association represents the nation's local gas utilities. AGA member companies acquire gas supply for, and distribute it to, their residential and commercial customers. As a result, the availability of adequate supplies of competitively priced natural gas is of critical importance to AGA and its member companies.

The natural gas industry is currently at a critical crossroads. The "gas bubble" of the 1980s and 1990s disappeared prior to the winter of 2000-2001. Supply and demand is now in precarious balance. The industry today no longer basks in prodigious supply; rather, it treads a supply tightrope, bringing with it unpleasant and undesirable economic and political consequences—most importantly high prices and higher price volatility. Both consequences harm natural gas consumers—residential, commercial, and industrial.

Energy is the lifeblood of our economy. High, volatile natural gas prices put America at a competitive disadvantage, cause plant closings, and idle workers. Government must take prompt and appropriate steps to ensure the nation of adequate supplies of natural gas at reasonable prices. Moreover, it is expected that natural gas demand will increase by 50 percent over the next two decades. This growth will occur because natural gas is the most environmentally friendly fossil fuel and because natural gas is an economic and reliable source of energy. It is in the national interest that natural gas be available to serve the demands of the market.

Many of the fields from which natural gas is currently produced are mature. Over the last two decades, technological advances have greatly enhanced the ability to find natural gas as well as to produce the maximum amount possible from a field. While technology will continue to improve, it is not likely that we will discover ways to extract even more hydrocarbons from existing fields.

If America's needs for energy are to be met, there is no choice except for exploration and production activity to migrate into new areas. The nation's natural gas resource base is rich and diverse. It is simply a matter of taking E&P activity to the many known areas where natural gas is found. Regrettably, many of these areas are either totally closed to exploration and development or are subject to so many restrictions that timely and economic development is not possible. The E&P business is, as a result of technological improvements, enormously more environmentally benign today than it was 25 years ago. As a result, current restrictions on land access need to be reevaluated given the nation's energy needs.

The most important step Congress can take to address these issues is to ensure that lands where natural gas is believed to exist are available for environmentally sound exploration and development. Additionally, it is appropriate to create incentives to seek and produce this natural gas.

TESTIMONY

Good afternoon. I am Bob Best, Chairman of Atmos Energy in Dallas, Texas, and 2002-2003 Vice Chairman of the American Gas Association in Washington, D.C. ("AGA"). AGA is grateful for the opportunity to share its views with you on the critical importance to the nation of ensuring ample natural gas supplies at competitive prices. Doing so is necessary for the nation, both to protect consumers and to address the energy and economic situations we currently face.

AGA is composed of 191 natural gas distribution companies, which deliver gas throughout the United States. Local gas utilities deliver gas to more than 64 million customers nationwide. AGA members deliver approximately 83 percent of this gas.

Our members are charged with the responsibility, under local law or regulation, of acquiring natural gas for the majority of their customers. Having available adequate supplies of natural gas at reasonable prices is thus a critical issue for AGA and its members. Accordingly, AGA members and the consumers they serve share both an interest and a perspective on this subject.

I would like to make clear that the bread and butter business of AGA members is acquiring and delivering natural gas to residential, commercial, and industrial consumers across America. Our members remain economically viable by delivering natural gas to consumers at the lowest reasonable price, which we do by operating our systems over a million miles of distribution lines—as efficiently as possible. Exploring for and producing natural gas is the business of our energy-industry colleagues in the oil and gas business, whether they are major, independent, or "Mom and Pop" operators. We are not here to speak for them today, but their continued success in providing natural gas to America's consumers is of great importance to us as well.

AGA is encouraged that Congress is coming to grips with this important issue. Adequate natural gas supply is crucial to all of America for a number of reasons. It is imperative that government take significant action in the very near term to assure the continued economic growth, environmental protection, and national security of our nation. The tumultuous events in energy markets over the last two years serve to underscore the importance of adequate and reliable supplies of reasonably priced natural gas to consumers, to the economy, and to national security.

The natural gas industry is presently at a critical crossroads. For the past three years gas production has had to operate full-tilt to meet consumer demand. The “surplus deliverability” or “gas bubble” of the late 1980’s and 1990’s is simply gone. No longer is demand met while unneeded production facilities sit idle. No longer can new demand be met by simply opening the valve a few turns. The valves are wide open.

The supply tightrope has brought with it several inexorable and unpleasant consequences—prices in the wholesale market have gone up and that market has become much more volatile. During the 2000-2001 heating season, for example, gas prices moved from the \$2 level to approximately \$10 and back again to nearly \$2. Such volatility hurts consumers, puts domestic industry at a competitive disadvantage, closes plants, and idles workers. The winter of 2000-2001 made it abundantly clear to us (and to you as well) that consumers do not like these price increases and they do not like the market volatility that is now an everyday norm. Unless significant actions are taken on the supply side, gas markets will remain tumultuous, and 64 million gas customers will suffer the consequences. As gas utilities, we have a number of programs in place to insulate consumers to some extent from the full impact of wholesale price volatility, but consumers must still ultimately pay the price.

The demand for natural gas in the U.S. is expected to increase 50 percent by 2015-2020. Growth seems inevitable because gas is a clean, economic, domestic source of available energy. It does not face the environmental hurdles of coal and nuclear energy, the economic and technological drawbacks of most renewable energy forms, or the national security problems associated with imported oil.

The challenge for both government and industry is quite straightforward: to ensure that the current need for natural gas is met and that the future need for natural gas will be met at reasonable and economic prices. There can be no responsible question that facilitating this result is sound public policy. Natural gas is abundant domestically, and natural gas is the environmentally friendly fuel of choice. Ensuring adequate natural gas supply will lead to reasonable prices for consumers, will dampen the unacceptable volatility of wholesale natural gas markets, will help keep the economy growing, and will help protect the environment.

America has a large and diverse natural gas resource; producing it, however, can be a challenge. Providing the natural gas that the economy requires will necessitate: (1) providing incentives to bring the plentiful reserves of North American natural gas to production and, hence, to market; (2) making available for exploration and production the lands where natural gas is already known to exist so gas can be produced on an economic and timely basis; (3) ensuring that the new infrastructure that will be needed to serve the market is in place in timely and economic fashion.

Natural gas—our cleanest fossil fuel—is found in abundance throughout both North America and the world. It currently meets one-fourth of the United States’ energy needs. Unlike oil, about 99 percent of the natural gas supplied to U.S. consumers originates in the United States or Canada.

The natural gas resource base in the U.S. has increased over the last several decades. In fact we now believe that we have more natural gas in the U.S. than we estimated twenty years ago, notwithstanding the production of between 300 and 400 trillion cubic feet of gas in the interim. This is true in part because new sources of gas, such as coalbed methane, have become an important part of the resource base.

Natural gas production is sustained and grows only by drilling in currently productive areas or by exploring in new areas. Over the past two decades a number of technological revolutions have swept across our industry. We are able today to drill for gas with dramatically greater success and with significantly reduced environmental impact than we did twenty years ago. We are also much more efficient in producing the maximum amount of natural gas from a given area of land. A host of technological advances allows producers to identify and extract natural gas deeper, smarter and more efficiently. For example, the drilling success rate for wells deeper than 15,000 feet has improved dramatically. In addition, gas trapped in coal seams, tight sands or shale is no longer out of reach.

While further improvements in this regard can be expected, they will not be sufficient to meet growing demand unless they are coupled with other measures. Regret-

tably, technology alone cannot indefinitely extend the production life of mature producing areas. New areas and sources of gas will be necessary.

Notwithstanding the dramatic impact of innovation upon our business, the inevitable fact today is that we have reached a point of rapidly diminishing returns with many existing natural gas fields. This is almost entirely a product of the laws of petroleum geology. The first ten wells in a field may ultimately produce 60 percent of the gas in that field, while it may take forty more to produce the balance. In many of the natural gas fields in America today, we are long past those first ten wells and are well into those forty wells in the field. In other words, the low-hanging fruit have already been picked in the orchards that are open for business.

Drilling activity in the U.S. has moved over time, from onshore Kansas, Oklahoma and Arkansas to offshore Texas and Louisiana, and then to the Rocky Mountains. Historically, we have been quite dependent on fields in the Gulf of Mexico. But recent production declines in the shallow waters of the Gulf of Mexico have necessitated migration of activity to deeper waters to offset this decline. These newer, more expensive, deepwater fields also tend to have short lives and significantly more rapid rates of decline in production than is the case with onshore wells.

In short, America's natural gas fields are mature—in fact many are well into their golden years. There is no new technology on the horizon that will permit us to pull a rabbit out of a hat in these fields. These simple, and incontrovertible, facts explain why we are today walking a supply tightrope and why the winter of 2000-2001 may become a regular occurrence, particularly at the point the economy returns to its full vigor. Having the winter of 2000-2001 return every year will undoubtedly put a brake on the economy, once again causing lost output, idle productive capacity, and lost jobs.

If we are to continue to meet the energy demands of America and its citizens and if we are to meet the demands that will they make upon us in the next two decades, we must change course. It will not be enough to make a slight adjustment of the tiller or to wait three or four more years to push it over full. Rather, we must come full about, and we must do it in the very near future. Lead times are long in our business, and meeting demand years down the road requires that we begin work today.

We have several reasonable and practical options. And, as I hope you do understand, continuing to do what we have been doing is simply not enough.

First, and most importantly, we must look to new frontiers within the United States. Further growth in production from this resource base is jeopardized by limitations currently placed on access to it. For example, most of the gas resource base off the East and West Coasts of the U.S. and the Eastern Gulf of Mexico is currently closed to any exploration and production activity. Moreover, access to large portions of the Rocky Mountains is severely restricted. The potential for increased production of natural gas is severely constrained so long as these restrictions remain in place.

In this vein, the Rocky Mountain region is expected to be a growing supplier of natural gas, but only if access to key prospects is not unduly impeded by stipulations and restrictions. Two separate studies by the National Petroleum Council and the U.S. Department of the Interior reached a similar conclusion—that nearly 40 percent of the gas resource base in the Rockies was restricted from development to some degree, some partially and some totally. On this issue the Department of the Interior noted that there are nearly 1,000 different stipulations that can impede resource development on federal lands.

One of the most significant new gas discoveries in North America in the past ten years is located just north of the US/Canada border in eastern Canada coastal waters on the Scotian shelf. Natural gas discoveries have been made at Sable Island and Deep Panuke. Gas production from Sable Island already serves Canada's Maritimes Provinces and New England through an offshore and land-based pipeline system. This has been done with positive economic benefits to the region and without environmental degradation. This experience provides an important example for the United States, where we believe the offshore Atlantic area to have similar geology.

In some areas we appear to be marching backward. The buy-back of federal leases where discoveries had already been made in the Destin Dome area (offshore Florida) of the eastern Gulf of Mexico was a serious step back in terms of satisfying consumer gas demand. This action was contrary to what needs to be done to meet America's energy needs. With Destin Dome we did not come full about, as we need to do; rather, we ran from the storm.

Geographic expansion of gas exploration and drilling activity has for the entirety of the last century been essential to sustaining growth in natural gas production. Future migration, to new frontiers, to new fields, in both the U.S. and Canada will also be critical. Without production from geographic areas that are currently subject

to access restrictions, it is not at all likely that producers will be able to continue to provide increased amounts of natural gas from the lower-48 states to customers for longer than 10 or 15 years. We believe that the same is true in Canada as well.

Quite simply, we do not believe that there is any way other than exploring for natural gas in new geographic areas to meet America's anticipated demand for natural gas unless we turn increasingly to sources located outside North America.

We do not advance this thesis lightly. Over the past two years both the American Gas Association and the American Gas Foundation have studied this important issue vigorously. We believe it is necessary that policy makers embrace this thesis so that natural gas can continue to be—as it has been for nearly a century—a safe and reliable form of energy that is America's best energy value and its most environmentally benign fossil fuel.

When the first energy shock transpired in the early 1970s, the nation learned, quite painfully, the price of dependency upon foreign sources of crude oil. We also learned, through long gasoline lines and shuttered factories, that energy is the lifeblood of our economy. Yet thirty years later we are even more dependent upon foreign oil than we were in 1970. Regrettably, the nation has since failed to make the policy choices that would have brought us freedom from undue dependence on foreign-source energy supplies. We hope that the nation can reflect upon that thirty-year experience and today make the correct policy choices with regard to its future natural gas supply. We can blame some of the past energy problems on a lack of foresight, understanding, and experience. We will not be permitted to do so again.

Meeting our nation's ever-increasing demand for energy has an impact on the environment, regardless of the energy source. The challenge, therefore, is to balance these competing policy objectives realistically. Even with dramatic improvements in the efficient use of energy, U.S. energy demand has increased more than 25 percent since 1973, and significant continued growth is almost certain. Satisfying this energy demand will continue to affect air, land and water. A great American success story is that, with but five percent of the world's population, we produce nearly one-third of the planet's economic output. And energy is an essential—indeed critical—input for that success story to both continue and grow.

It is imperative that energy needs be balanced with environmental impacts and that this evaluation be complete and up-to-date. There is no doubt that growing usage of natural gas harmonizes both objectives. Finding and producing natural gas is today accomplished through sophisticated technologies and methodologies that are cleaner, more efficient and much more environmentally sound than those used in the 1970s. It is unfortunate that many restrictions on natural gas production have simply not taken account of the important technological developments of the preceding thirty years. The result has been policies that deter and forestall increased usage of natural gas, which is, after all, the nation's most environmentally benign and cost-effective energy source.

Natural gas consumers enjoyed stable prices from the mid-1980s to 2000, with prices that actually fell when adjusted for inflation. Today, however, the balance between supply and demand has become extremely tight, creating the tightrope effect. Even small changes in weather, economic activity and world energy trends result in wholesale natural gas price fluctuations. We saw this most dramatically in the winter of 2000-2001. In the 1980s and '90s, when the wholesale (wellhead) price of traditional natural gas sources was around \$2 per million British thermal units, natural gas from deep waters and Alaska, as well as LNG, may not have been price competitive. However, most analysts suggest that these sources are competitive when gas is in a \$3.00 to \$4.00 price environment. Increased volumes of natural gas from a wider mix of sources will be vital to meeting consumer demand and to ensuring that natural gas remains affordable.

Increasing natural gas supplies will boost economic development and will promote environmental protection, while ensuring more stable prices for natural gas customers. Most importantly, increasing natural gas supplies will give customers ours and yours—what they seek—reasonable prices, greater price stability, and fuel for our vibrant economy. However, without policy changes with regard to natural gas supply, as well as expansion of production, pipeline and local delivery infrastructure for natural gas, the natural gas industry will have difficulty meeting the anticipated 50 percent increase in market demand. Price increases, price volatility, and a brake on the economy will be inevitable.

Second, we can increase our focus on non-traditional sources, such as liquefied natural gas (LNG). Reliance upon LNG has been modest to date, but it is clear that increases will be necessary to meet growing market demand. Today, roughly 99 percent of the U.S. gas supply comes from traditional land-based and offshore supply areas in North America. But, during the next two decades, non-traditional supply sources such as LNG will likely account for a significantly larger share of the supply

mix. LNG has become increasingly economic. It is a commonly used worldwide technology that allows natural gas produced in one part of the world to be liquefied through a chilling process, transported via tanker and then re-gasified and injected into the pipeline system of the receiving country. Although LNG currently supplies less than 1 percent of the gas consumed in the U.S., it represents 100 percent of the gas consumed in Japan. LNG has proven to be safe, economical and consistent with environmental quality. Due to constraints on other forms of gas supply and increasingly favorable LNG economics, LNG is likely to be a more significant contributor to U.S. gas markets in the future. It will certainly not be as large a contributor as imported oil (nearly 60 percent of U.S. oil consumption), but it could account for 10-15 percent of domestic gas consumption 15-20 years from now if pursued aggressively and if impediments are reduced.

Third, we can tap the huge potential of Alaska. Alaska is estimated to contain more than 250 trillion cubic feet enough to satisfy U.S. natural gas demand by itself for more than a decade. Authorizations were granted twenty-five years ago to move gas from the North Slope to the Lower-48, yet no gas is flowing today nor is any transportation system yet under construction. Indeed, every day the North Slope produces approximately 8 billion cubic feet of natural gas that is re-injected because it has no way to market. Alaskan gas has the potential to be the single largest source of price and volatility relief for U.S. gas consumers. Deliveries from the North Slope would not only put downward pressure on gas prices, but they would also spur the development of other gas sources in the state as well as in northern Canada.

Fourth, we can look to our neighbors to the north. Canadian gas supply has grown dramatically over the last decade in terms of the portion of the U.S. market that it has captured. At present, Canada supplies approximately 15 percent of the United States' needs. We should continue to rely upon Canadian gas, but it may not be realistic to expect the U.S. market share for Canadian gas to continue to grow as it has in the past or to rely upon Canadian new frontier gas to meet the bulk of the increased demand that lay ahead in the United States.

RECOMMENDATIONS

To promote meeting consumer needs, economic vitality, and sound environmental stewardship, the American Gas Association urges the Congress as follows:

- Current restrictions on access to new sources of natural gas supply must be re-evaluated in light of technological improvements that have made natural gas exploration and production more environmentally sensitive.
- Federal and state officials must take the lead in overcoming the pervasive "not in my backyard" attitude toward energy infrastructure development, including gas production.
- Interagency activity directed specifically toward expediting environmental review and permitting of natural gas pipelines and drilling programs is necessary, and agencies must be held responsible for not meeting time stipulations on lease, lease review, and permitting procedures.
- Federal lands must continue to be leased for multi-purpose use, including oil and gas extraction and infrastructure construction.
- Tax provisions such as percentage depletion, expensing geological and geophysical costs in the year incurred, Section 29 credits, and other credits encourage investment in drilling programs, and such provisions are often necessary, particularly in areas faced with increasing costs due to environmental and other stipulations.
- Economic viability must be considered along with environmental and technology standards in an effort to develop a "least impact" approach to exploration and development but not a "zero impact".
- The geologic conditions for oil and gas discovery similar to that in eastern Canada extend to the U.S. mid-Atlantic area.

Although some prospects have been previously tested, new evaluations of Atlantic oil and gas potential should be completed using today's technology in contrast to that of 20 to 30 years ago.

The federal government should facilitate this activity by lifting or modifying the current moratoria regarding drilling and other activities in the Atlantic Offshore to ensure that adequate geological and geophysical evaluations can be made and that exploratory drilling can proceed.

The federal government must work with the Atlantic Coast states to assist—not impede—the process of moving natural gas supplies to nearby markets should gas resources be discovered in commercial quantities. Federal agencies and states must work together to ensure the quality of the environment but they must also ensure

that infrastructure (such as landing an offshore pipeline) is permitted and not held up by multi-jurisdictional roadblocks.

- The Federal government should continue to permit royalty relief where appropriate to change the risk profile for companies trying to manage the technical and regulatory risks of operations in deepwater.
- Coastal Zone Management (CZMA) is being used to threaten or thwart offshore natural gas production and the pipeline infrastructure necessary to deliver natural gas to markets in ways not originally intended. Companies face this impediment even though leases to be developed may be 100 miles offshore. These impediments must be eliminated or at least managed within a context of making safe, secure delivery of natural gas to market a reality.
- The U.S. government should work closely with Canadian and Mexican officials to address the challenges of supplying North America with competitively priced natural gas in an environmentally sound manner.
- Renewable forms of energy should play a greater role in meeting U.S. energy needs, but government officials and customers must realize that all forms of energy have environmental impacts.
- Construction of an Alaskan natural gas pipeline must begin as quickly as possible.

Construction of this pipeline is possible with acceptable levels of environmental impact.

The pipeline project would be the largest private sector investment in history, and it would pose a huge financial risk to project sponsors.

The project will not be undertaken without some form of federal support—loan guarantee, accelerated depreciation, investment tax credit and/or marginal well tax credit.

These forms of support are not unprecedented and they would reduce project risk thereby reducing transportation charges that are ultimately borne by the consumer.

- The Federal Energy Regulatory Commission (FERC) announced in a new policy in December of 2002 that it would not require LNG terminals to be “open access” (that is, common carriers) at the point where tankers offload LNG. This policy will spur LNG development because it reduces project uncertainty and risk. Other federal and state agencies should review any regulations that impede LNG projects and act similarly to reduce or eliminate these impediments.

The siting of LNG off-loading terminals (currently four operable are in the U.S.) is generally the most time consuming roadblock for new LNG projects. Federal agencies should take the lead in demonstrating the need for timely approval of proposed off-loading terminals, and state officials must begin to view such projects as a means to satisfy supply and price concerns of residential, commercial and industrial customers.

The CHAIRMAN. Thank you. Would you take your last sentence that you stated in the record and repeat it again?

Mr. BEST. The last sentence? Yes. Assuring long-term adequate natural gas supply will lead to reasonable prices for consumers, dampen the unacceptable volatility of wholesale natural gas markets, keep the economy growing, help protect the environment, and eliminate the need to rely on other, less desirable fuels.

The CHAIRMAN. We are going to go on the 5-minute rule now, everybody, and we will get our chance here. And why don't we just stay with you for a minute, Mr. Best. Is that last statement of yours saying we need to produce more gas?

Mr. BEST. That is my belief, sir. I have been in the business 28 years. I have been in the interstate pipeline side. I am now in the retail consumer side. I believe that we need more gas supply. We are not an E&P. We are not going to benefit directly. We benefit by our demand going up. Any time the prices get too high, as the Senator read in that letter, our demand is dampened, and I will tell you this, demand is more elastic than we ever realized it was. People will resort to turning down thermostats, or other fuels. So I see it, we need incentives. We need an energy policy that encourages more gas supply.

The CHAIRMAN. Okay, now—first, Mr. Caruso, let me ask you one. What percentage of the gas is sold on the spot market?

Mr. CARUSO. That is a number that, of course, is a bit elusive, but industry people we have spoken with unanimously believe it is below 10 percent, and could be substantially less. The problem is that many of these spot volumes get resold, so there is a lot more transactions than physical sales on the spot market.

The CHAIRMAN. So when we hear a price of a certain amount, spot price at a certain time, a certain day, that does not mean the price across the range of users in the country. That means the spot.

Mr. CARUSO. Absolutely.

The CHAIRMAN. That is the last increment that is purchased on that particular day at that particular time.

Mr. CARUSO. Exactly. It is the marginal supply.

The CHAIRMAN. Now, what do you think of the accusations of price-fixing in the letter that was read?

Mr. CARUSO. Well, of course, the EIA is not a regulatory agency.

The CHAIRMAN. I understand.

Mr. CARUSO. I think it is probably a statement born out of frustration. I agree with Mr. Best's last comment, that there is an elasticity in demand for gas, but it is a longer-term elasticity.

In the very short run, as we are experiencing right now, with working gas and storage so low, and increased demand through a cold snap, or what-have-you, it is very inelastic, so you get very large jumps in price due to very small volumetric changes. I think that is what we are witnessing now.

The CHAIRMAN. To each of you—quickly, one or two statements by each of you, starting with Mr. Welch. What two or three things do you recommend we do with reference to easing the natural gas problem as you see it?

Mr. WELCH. Well, there is a short- and long-term answer. Short-term, I think we need to let the market work. I think demand is elastic. When prices are high, like they are now, that would spur as much activity in the industry as is possible, and that will happen. Longer-term, I think there are policy decisions that need to be made now that can unlock new large sources of natural gas, such as the Alaska Gas Pipeline, which is a basin-opening piece of infrastructure.

The CHAIRMAN. Okay.

Mr. Best.

Mr. BEST. Mr. Chairman, I would like to make one point. Back to the spot market question. We, as a utility, had already bought 50 percent of our gas going into the winter, so we will not be paying these prices even that are out on the market today, so most companies like ours will hedge between 20 and 30 percent of their gas so we are not paying today's prices for all of our gas.

As far as your question about what should be done, I guess we think we would like to see five major things in the bill. I mentioned earlier, tax incentive and access provisions, but also—those are the first two. The third would be, encouragement of building of infrastructure to get the gas to market. Again, we are going to have to—and there are some depreciation provisions in the bill that help that.

The fourth one is, we continue to encourage greater funding for LIHEAP, because as gas prices are higher, we do have customers who have difficulty paying their bills, and we think that is something that needs to be done by the Congress to make sure we take care of people who are less fortunate.

And the fifth would be a continuing emphasis on conservation. We are for conservation, and at the forefront of leading that, so we think there certainly should be some emphasis in this bill to continue to encourage conservation.

The CHAIRMAN. Mr. Rattie.

Mr. RATTIE. I will just try to add to that, Mr. Chairman. In addition to tax policies longer-term, short-term I would agree wholeheartedly with a statement made earlier and included in my remarks, we have to let the market work, and it is working. The rig count is rising, demand is falling. I would bet that prices will be lower later this year. Just as we saw in 2001, the market responded to the price signals.

As other panelists have already noted, while spot prices have shot through the ceiling, there is not a lot of volume moved on that. In fact, a subsidiary of my company provides natural gas supply to Mr. Huntsman, at least to some of his facilities in Utah, and I can assure you those supplies were procured a long time ago at prices far below what current spot market prices are.

I think it is unfortunate that leading businessmen would set us off on a red herring, making allegations that this is all due to market manipulation. These are signals that the market is sending us that we ignored 2 years ago. We should not ignore them today.

Access to Federal lands is by far and away the most important issue, long-term, that Congress can deal with. We cannot set aside 40 percent of our potential natural gas resource base and expect to have supply to meet the kind of demand that the EIA is projecting. While we spend a lot of time worrying about the consequences of drilling and of industry's activities on the environment and wildlife, what we do not hear enough of is the fact that the decision not to develop our domestic gas resources has human consequences that are getting ignored, so access to Federal lands long-term is vital.

The CHAIRMAN. All right. Senator Bingaman, we are going to cede in the following order: Senator Bingaman, Senator Thomas, Senator Landrieu, and Senator Alexander. I, again, am going to excuse myself shortly and let Senator Thomas conduct the meeting. I just want to say, by way of my concern as chairman, I would say to all of you, that was great testimony. I very much enjoyed it. We almost hear the exact same thing—we could go back and read it—last year. It was the same kind of testimony.

Whenever we look at access, it seems like there are lands out there that we ought to be attempting to get resources from, but nobody really thinks that it is that land. They go look at it, and somebody has a reason for not doing it there and, of course, that isn't the land that is really going to make any difference.

We have to get to, come up with some kind of conclusion as to what that means. I would say for now, the access in the Rocky Mountain and Western area that has been alleged by so many to be there in such large quantities is not proving out to be that much, when you look at precisely what is there, and we will con-

tinue to do that and have staff people do it, but it is very difficult to locate it in the large quantities that have been spoken of, unless you go offshore. If you go offshore, you start talking about big numbers.

Senator Bingaman, I wanted to say, you have worked on a number of these issues over and over, and I would hope that in this area of natural gas, we could come up with something together that we might pursue and push ahead for what has been recommended here today and that we are hearing from the people.

Thank you all very much.

Senator BINGAMAN. Thank you, Mr. Chairman. I agree with you, there is a lot that we should be able to do together on this to deal with this problem. Let me get back to a statement Mr. Best made there about an adequate supply at reasonable prices is the interest that your company has. That is our interest, too, I think, adequate supply at reasonable prices. What can be done, what should be done, or could be done to deal with the enormous volatility in wholesale prices of natural gas that we are facing?

If, in fact, the price is now \$18 to \$20 per mcf, that is about twice what it was 2 years ago in California. At that time, I guess, it has now come out that there were some market manipulation activities going on. I do not know how much of the price increases there were explained by that. I do not think any of us know that.

Mr. Caruso, do you have any ideas of what could be done to get some of the volatility out of this? Or do you think that should not be done?

Mr. CARUSO. Well, I think volatility certainly has a dampening effect on investment decisions. In general the market should be allowed to work. One of the things that increases the availability of supply and options in the gas market that we do not have is a world global market for natural gas. So in a situation like this, where natural gas prices have spiked, if there were a world spot market, you might see LNG cargoes coming in very quickly.

I think developing an infrastructure, whether it be Alaska, the Mackenzie Delta, domestic, and LNG, all are needed, and I think that is the only way you are going to really reduce the volatility. You will still have some volatility, but it will be more manageable.

Senator BINGAMAN. Do any of the rest of you have a comment on this issue of volatility and wholesale gas prices? Whether any action should be taken? My own reaction is that if we want adequate supplies at reasonable prices and these are not reasonable prices. I guess it is some consolation to say most people are not paying these prices because they have long-term contracts, but some people are. I mean, some portion of the gas that various people are buying is being priced at this level, presumably, if they are in the market today.

Mr. BEST. I will just comment, one of the things we are trying to do, of course, in our business we are trying to take the volatility out of our pricing, because that is what our customers want. That is what our regulators want. I think the way that we can do some of that is convince our regulators that we need a little bit longer-term contracts—to be able to enter into some longer-term contracts, because, as I said at the beginning, we have hedged about 50 percent of our gas for this winter, and that gas was hedged under \$4,

so we went into the winter and we have some storage, and we as an LDC have to fill our storage. I mean, we do not try to—we are not in the commercial business, we are in the reliability business, so we have to fill our storage.

I think if we could convince our regulators—I am not talking about 15-year contracts, but if there was a liquid enough market and we could enter into 3- to 5-year contracts at lower prices, now the danger is, of course, is when you do that, then the market falls lower than that, and then that causes its own set of issues, but as I see it, I do not think—I mean, we have got deregulation at the wellhead.

We have a market in which price regulates supply and demand, and so I think at long-term that still is the best model, but I do think that we have got to convince those that we deal with that we need to maybe have the ability to enter into longer-term contracts to try to take as much volatility out of the market as we can.

Senator BINGAMAN. Mr. Rattie, did you have a comment?

Mr. RATTIE. Yes, sir. Volatility in energy markets is the way the market rationalizes demand in the face of constrained supply, and I think it is evidence that the markets are working. I would echo everything that Mr. Best said. Our utility has secured natural gas supplies under long-term supply agreements that are by and large protecting residential customers in our market region from the brunt of this. There is very little volume moving at these prices. A lot of it is people speculating, and speculators have a role in a market that is like this.

The reason we are seeing this today and we did not see it 10 years ago is, 10 years ago we had a lot of surplus capacity in our system. We had extra pipeline capacity. We had extra deliverability from production facilities. None of that is there today, so we get a situation where we get a short-term surge in demand and a year like last year, where drilling was down because prices had been lower in the first part of the year, and we are just too tight. We cannot deal with that.

Senator BINGAMAN. Mr. Welch.

Mr. WELCH. I just wanted to mention one thing in this regard as well. I think the best thing you could do to improve volatility, which it is not good for our customers, as we just heard, and it is not really good for us, either, because it makes investment decisions almost impossible to make, the best thing that we could do is hook up all sources of domestic supply that are available within the political framework, and I know some areas are off limits and they will probably remain off limits, but the areas that are open to us, we should get those going.

And I agree with Mr. Caruso that the reserve-to-production ratio here in the United States is around 10 or so. On the world market for gas, it is 60, so there is a lot of natural gas around the world, and I think the key to putting a little stability in there is making sure that we have adequate LNG infrastructures, which will be at the margin.

I see there is going to be room for our gas from South Louisiana from the Gulf of Mexico, from the Rocky Mountains, from Canada, from Alaska, any place in North America, but that is going to be a base load. Where we get to the margin, and we are competing

with other countries like Japan and others for LNG, that is where having the LNG infrastructure would help mitigate the volatility in the market, and fortunately FERC is moving in the right direction.

Senator BINGAMAN. You say fortunately they are?

Mr. WELCH. They are. Indeed they are.

Senator BINGAMAN. Thank you, Mr. Chairman.

Senator THOMAS. I guess I am next and then Senator Landrieu. We will try to hold to five minutes each in our questions.

The price you mentioned, Mr. Caruso, is at Henry Hub. Do you have any idea what the wellhead price is in Powder River Basin or at the Opel Hub?

Mr. CARUSO. \$6.50 wellhead.

Senator THOMAS. Do you see anything wrong with that? That is more than twice as much at the Henry Hub than it is at the wellhead.

Mr. CARUSO. It just shows the point we just referred to, the volatility.

Senator THOMAS. I do not think that is volatility. That has a little to do with the ability to transport the product. That has been our problem in Wyoming for a very long time. There has been a big price differential as close as the Cheyenne Hub, so I think—we talked about production all the time, but it is not only production. I think that is the issue here, because production is in the West and the market is certainly the East, or at least in the Midwest. What do you think, Mr. Rattie, it would take to really increase capacity in pipelines?

Mr. RATTIE. Senator Thomas, thank you for that question, and I would like to first comment on the Rockies situation, because you are spot on. Wellhead prices in the Rockies are well below the wellhead prices in other regions, and that is for the simple reason that this country owes a debt of gratitude to the State of Wyoming. It is the only State in the lower 48 that has grown its productive capability, the supply, in any significant amount in the last few years.

Unfortunately, pipeline development has not kept pace with that growing supply, and we have problems getting gas out of the region. Only about 20 percent of the natural gas that gets produced in the Rocky Mountain region actually gets consumed in the region. The other 80 percent has to move on long-haul pipes that have to get to the Upper Midwest markets, or to markets out in the West, and we simply have not been able to keep pace with supply in pipeline development.

Now, why is that? Well, a large portion of land in the West, in the Rockies, in key producing regions in the Rockies in particular, are Federal lands and State lands, and we go through an onerous web of complex, conflicting policy administration, overlapping jurisdiction. The barriers that we throw in the way of pipeline development out West are a significant contributor to some of the problems we are experiencing in the market today.

We have to find a way to build the pipelines, to move the gas from regions like the Rockies, where supply has the potential to grow, to regions like California that are dependent upon Wyoming gas for market—

Senator THOMAS. I agree with you entirely.

One of the difficulties with that, of course, and you are in the transportation business, Mr. Best, who is going to finance pipelines like from Alaska? Who is going to finance them? How are you going to adjudicate the capacity to avoid—which is part of our problem? Someone owns capacity, so they buy the gas at a very low price because no one else can move it, and then sell it at a high price. That is distortion. How do you say we are going to pay for pipelines, and make them fair and open to everyone?

Mr. BEST. I think the economics are showing, and we are not in the long-line pipeline or the production business, but I think the economics are showing that you can have gas priced in the \$3 to \$5 range, and that those type projects can be financed.

Now, I think, as Mr. Rattie said earlier, those pipelines, the Alaskan Oil Pipeline, a lot of the myths that were put up or barriers have been overcome and proven wrong, and I just, I think those type of projects will be financed with the right incentives.

Senator THOMAS. Okay. Well, I think that is probably true, but I think you also have to be careful about who has the available capacity, and eminent domain is not an easy thing, and there are quite a few problems attached to it, of course.

Now, gas consumption, as you pointed out, is very seasonal. Who could level out the demand with the production to storage?

Mr. CARUSO. Well, we have a very robust storage system.

Senator THOMAS. Apparently it did not work very well this winter.

Mr. CARUSO. Not robust enough, but one of the things that is changing is that because of the increased demand in the electric power sector, the seasonality is becoming less of a factor. So this is a requirement of improving not only, as you point out, the storage, but deliverability.

Senator THOMAS. Electric generators are also a little more insensitive to price, because there is nothing they can do about it.

Mr. CARUSO. And many of them are not being built with alternative or switchable fuels.

Senator THOMAS. Senator Landrieu. Thank you, gentlemen.

Senator LANDRIEU. Thank you, Senator. I appreciate having the opportunity to just make a few comments, and I have a statement to submit for the record.

Senator THOMAS. Without objection.

[The prepared statement of Senator Landrieu follows:]

PREPARED STATEMENT OF HON. MARY L. LANDRIEU, U.S. SENATOR
FROM LOUISIANA

Today, we confront a dilemma similar to the one we discussed two weeks ago during our hearing on oil supply and prices.

However, unlike two weeks ago we cannot blame these very high prices and tight supply on the prospect of war or another country's political chaos. The situation we are faced with today is entirely of our own doing—the rising price of natural gas and shortage of supply to meet a growing demand falls squarely on us.

Much is at stake. For Example, in my state of Louisiana, where natural gas is plentiful and produced consistently, two industries that depend heavily on natural gas are paying the price for the high cost.

Over the last four years, two thousand jobs have been lost in the ammonia industry in my state and nine companies have been reduced to five. For the chemical industry, natural gas accounts for more than half of its energy needs in the U.S. In fact, the chemical industry is second only to electric utilities in domestic natural gas consumption.

What does the high price of natural gas mean for the chemical industry? Well, recently one company moved more than 750 million pounds of ethylene production from Plaquemine, Louisiana to Germany. A Disconcerting omen indeed.

Currently, we produce about 84% of the natural gas we consume. But there is a gap between supply and demand that is looming on the horizon. The Energy Information Administration is projecting domestic production of natural gas to grow by 1.3% per year while demand is expected to grow by 1.8% annually. By 2025, EIA Projects that imports of natural gas will provide 22% of demand. quite simply, we are facing the prospect of our natural gas market following in the footsteps of our oil market where imports continue to account for a growing percentage of supply.

The "Catch-22" we find ourselves in, while obvious, will require some tough choices to solve the problem. Do we want to continue to make natural gas the fuel of choice for sectors such as electricity? What about providing tax incentives to develop unconventional sources such as coalbed methane or deep water drilling? While I support a number of these incentives are they alone the answer? What about the construction of a pipeline to transport what are anticipated to be vast reserves in Alaska's North Slope to the lower 48 states. Can we accomplish this feat without disrupting the natural gas market?

Is it time to revisit areas of the country currently under moratoria?

Two years ago, I, Along with the ranking member of this committee, led a fight to stop the current administration (Bush) from reducing the area of a lease sale in the eastern Gulf of Mexico—Lease Sale 181—that had already been approved by the administration (Clinton) before it and could have provided as much as 8 TCF of natural gas for the country. In fact, the area was reduced to such an extent that on only 1/8 of that natural gas is now available. While it is fine for states to determine they do not want natural gas production off their shores, it is hypocritical for them to continue to rely on natural gas produced off the shores of other states for their supply without making any sacrifice.

With less and less areas available for production, and the deepwaters of the Gulf of Mexico still a hotspot for the foreseeable future, it is time for Congress and the Federal Government to recognize the importance of the development that has been occurring and continues to take place off the shores of Louisiana and Texas. The OCS currently supplies 25% of the nation's natural gas and in FY 2001, 80% of the gas produced on the OCS came from leases located offshore Louisiana—and compensate those states for their role in providing the nation's energy supply.

Another question to consider is are we willing to reduce our demand for natural gas and turn to other sources of energy to generate electricity such as nuclear power? While one day I hope we can turn to renewable sources of energy to satisfy our demand it does not appear that we are there yet.

Finally, if we do nothing and demand continues to surpass supply we will inevitably end up increasing our supply of imported natural gas or LNG. While most of the gas we import today comes via pipeline from Canada, the EIA Estimates that half of the increase in U.S. imports will come from LNG. Already we have three LNG terminals in the country, with one located in Lake Charles, Louisiana, and two more on the way to receive gas from countries such as Trinidad and Tobago, Qatar, Algeria, Nigeria, Oman, Indonesia and the United Arab Emirates.

I look forward to the testimony of the witnesses as well as my colleagues on the committee. I hope we are all up to the challenge before us as doing nothing is not a choice.

Senator LANDRIEU. But just to go over a couple of points by way of a question, all of you mentioned this to some degree, but for the record, would each of you just repeat what are the more promising areas of natural gas exploration in the country today, and maybe you could list them in your top 1, 2, and 3, and as you answer that, would you specifically talk about lease sale 181 in the gulf?

Mr. Rattie.

Mr. RATTIE. The most promising area for natural gas development in the country is Alaska. We have enormous resources up there that are underutilized, and I think everybody on this panel and I think everybody in the industry would strongly support any effort to try to facilitate the development of a pipeline that would bring those supplies down to the lower 48.

In addition to Alaska, the Rocky Mountain region is by far the most underdeveloped and under-exploited region in the country.

We have seen significant supply growth in the last 3 years, as I talked about earlier, but we have not really scratched the surface there yet. There is a lot of known sedimentary section below 15,000 feet that has not been drilled and tested. We are going to find a lot of gas in the Rockies, but we are going to have to get the gas out of the Rockies to where the markets are, the Midwest and the West, in order to take advantage of that abundant supply.

And then, of course, the Gulf Coast, Texas, Louisiana, and the Gulf of Mexico continue to be very important. There is an interesting phenomena there, though that the Outer Continental Shelf in the Gulf of Mexico historically has been one of the largest producing supply basins in this country. The shelf is tired, and producers there are having a hard time even keeping production flat. In fact, it is declining.

The Deepwater, as I think the gentleman from BP mentioned, has turned out to be predominantly an oil play, and there is a lot of associated gas, and there is a lot more exploration that has to be done in the Deepwater, but so far it has turned out to be very oily.

And then there is this broad category of what is called unconventional gas that we have only begun to tap in the last decade. I mentioned the Powder River Basin in Wyoming, the San Juan Basin in the Four Corners area, New Mexico. We are looking at coal-based methane development in other areas of the Rockies that show a lot of promise right now, and those plays benefitted significantly in the past from a little bit of a boost from section 29 tax credits, and I would submit that that would be a prudent policy to carry forward to keep that—to continue to incentivize the development of those new sources.

Senator LANDRIEU. But are you saying, just for the record, because it is contrary to what I understand, and maybe I am misinformed, but that Lease Sale 181, which is predominantly a gas field in the gulf, is tired, because that would be shocking because they have not drilled there.

Mr. RATTIE. No. I am saying the traditional development areas of the Outer Continental Shelf in shallow waters up to 200 feet off the coast of primarily Louisiana, Texas, a little bit of Alabama, but Lease Sale 181 is a great example of an area that we have to find a way to let the industry evaluate the resource potential there. There are enormous amounts of natural gas likely to be found that can be developed in deeper waters, and in waters in the Eastern Gulf of Mexico, which have been relatively under-evaluated.

Senator LANDRIEU. Mr. Best.

Mr. BEST. Senator, since we are not in the E&P business, I defer to Mr. Rattie and Mr. Welch, but I will agree with them that what Mr. Rattie said in Alaska and Rocky Mountains and offshore Louisiana and Texas, that what we see from a distribution company standpoint are the best provinces.

Senator LANDRIEU. What about Mississippi, Alabama, Florida? There is not any gas off of those coasts?

Mr. BEST. Well, in Alabama there certainly has been some coal seam methane gas which has been found and developed, and is still being developed, and I think off of Mississippi there is some development going on, off of Alabama in the Mobile Bay area there has

been some findings, but I think the three best provinces are still the three that Mr. Rattie mentioned.

Senator LANDRIEU. Okay.

Mr. Welch.

Mr. WELCH. Yes, Senator, I would have to agree that Alaska, Rocky Mountains, of the currently accessible areas are certainly the big two, and the third one, rather than, say, Gulf of Mexico, which we have a big presence in the gulf. We are the biggest player in Deepwater, actually. I would have to say it is actually LNG, which is not, I know, a domestic source, but it is the thing that will give us the greatest flexibility with respect to maintaining stability in the market. You can never underestimate what the Gulf of Mexico might do.

As you know, Sale 181 was curtailed in the acreage, which was open for bidding there. What lies off the coast of Florida is really an unknown at this point, as are the east and west coast of the United States, so we have focused all of our effort and study on the areas that we can get at.

Senator LANDRIEU. Mr. Caruso.

Mr. CARUSO. In our long-term supply outlook, the three largest suppliers are Alaska, as already mentioned, the unconventional natural gas in tight sandstone formations in the Rocky Mountains, and the Gulf of Mexico. Those are the three largest. I do not have any specific information on the Lease Sale 181 area.

Senator LANDRIEU. Well, the reason I bring that up, obviously, is, as a State that produces a tremendous amount of natural gas, and we are proud of that production, and we believe that it contributes greatly to the national security of this Nation, because we are open to production. We are proud of doing it in a more and more environmentally friendly way, using the new technologies that are available.

But one of the dilemmas that I find in this discussion is that because there are certain areas that have been explored more fully, and because even the just preliminary discoveries or exploration is prohibited in so many areas, we are not really getting an accurate picture of what some of these reserves could potentially be, whether it is oil reserves or gas reserves.

In this hearing we are focused on gas, and unlike last week, when we had a hearing which was very helpful about the price of oil and the tightening of markets, and we basically addressed the issue of it being a world price, and we had limited control. We do have more control over gas than we do of the oil price, because it is our own market, and by opening up regions in this country in the appropriate ways, by building infrastructure for liquified natural gas, by opening up Alaska. We could really help to increase supply to stabilize these prices.

I just want to say for the record, Mr. Chairman, that while some people might think, well, Senator Landrieu and Senator Breaux would be happy because the price is high, I want to agree with these panelists, it does not help us when the price is too high. My chemical industry is hurting, my manufacturers are hurting, my farmers are hurting, our agricultural interests are hurting, and just because we are a producer, it is not in our short-term or long-term interest for the price to be this high and volatile, so I really

hope that, as we struggle to put together another energy bill, we will again focus on these issues.

And the final point I want to make is to just throw out a question that needs no answer, because I think it is obvious, or evident. What incentive is it for States like Alaska or Louisiana, or for the Rocky Mountain States to produce, if those counties or those parishes or those States do not directly benefit from the production?

Now, you might say, well, you get the jobs, and you get the infrastructure. You know, we work—I do not know if you all work this way in the Rockies or in New Mexico, but our offshore oil workers work 7 days on and 7 days off. People come from all over the country to work on the rigs offshore of Louisiana, and they cash their paychecks on Friday. They do not always cash them in Louisiana. We pick up the cost for roads, the police, fire protection, evacuation, the infrastructure, and getting fresh water to everybody out in the gulf. We are happy to produce it, but we do not share in the royalties, because of the arcane, backward and unjust rules of this Nation, in any percentage of those offshore oil and gas revenues.

Just in terms of fairness, counties and parishes should share in that production to compensate for the impacts, where there are some, to environmental sensitive areas, as well as just for the fairness of that issue. I would hope that this inequity would be addressed in our next energy bill.

Thank you for your comments, and I hope we will be more aggressive in the development of our domestic production. Thank you.

Senator THOMAS. Senator Bingaman.

Senator BINGAMAN. Thank you, Mr. Chairman. Let me ask a couple of other questions about LNG.

Mr. Welch, you indicated that one of the things that is needed is more development of LNG as a way to guard against increased volatility and basically provide a buffer, as I understand it, to add to the base supply that we have.

Mr. Caruso, in your testimony, as I understand it, you are estimating that there will be three LNG—additional LNG terminals constructed between now and 2025?

Mr. CARUSO. Yes.

Senator BINGAMAN. That does not sound very promising to me. As I understand it, there were 16 announced proposals for new LNG import terminals to serve the U.S. market, but you are saying only three are going to be built in the next 22 years. Could you explain that?

Mr. CARUSO. Yes, Senator Bingaman. We have three additional LNG terminals in our long-term forecast for supply. An additional fourth one is expected to be built in Baja Mexico to serve exclusively the California market, so one could include it.

In addition, we also project all four of the existing terminals would be expanded, so there is more than just the four new ones, so there is a total of 2 tcf of LNG assumed to be imported by 2025.

Senator BINGAMAN. 2 tcf out of 35?

Mr. CARUSO. Yes, 6 percent.

Senator BINGAMAN. So you are estimating that we will be 6 percent dependent upon LNG for our natural gas needs by 2025?

Mr. CARUSO. That is correct.

Senator BINGAMAN. That does not sound to me like that is going to be adequate for the needs that I have seen on some of these charts and some of the testimony I am hearing here. I do not know, maybe—

Mr. CARUSO. It is highly dependent on the price, and what happens in Alaska and the Mackenzie Delta.

Senator BINGAMAN. It just seems like there is a disconnect. You have El Paso and Dynegy putting up their energy assets for sale, which I would think is an indication that they do not think the return is going to be there long-term, or short-term. We have the price of gas spiking to record highs. At least you do not believe that there are credible proposals to do a whole lot to expand our LNG capacity, or our capacity to bring in LNG. Is that a fair statement?

Mr. CARUSO. I think given the outlook we have for prices, that is the balance between the new sources we see, that Alaska would come on, the Mackenzie Delta would come on, so there is a balance, a mixture of these new sources. LNG for the new terminals would require a higher price, for example, than Alaska. We have about a \$3.50 price that we think would incentivize the Alaska line, for example, but a new LNG terminal in New England would be about \$4.10, so it is a bit more expensive.

Senator BINGAMAN. Do you have any thoughts on this, Mr. Welch, as to whether you think this is a reasonable forecast of what is going to happen in the LNG area?

Mr. WELCH. Let me just say that I think we have a little more bearish view of what the traditional basins will be able to supply than the EIA. I think from hearing Mr. Caruso's testimony, the EIA feels like they will be able to be flat, or actually grow from existing supply basins. My belief is that these older basins, which some of them we have been in for 50 or 90 years, are going to continue to decline. Therefore, we would see a higher need for LNG terminals, even with these other large sources of gas coming in.

I think the figures are that there is about, as soon as this fourth LNG facility comes online in the next quarter, there will be capacity for about 2 billion cubic feet of LNG coming into the country as of this year. Expansion of those four could get you to 4 billion cubic feet, and there are, as you mentioned, a number of proposals.

BP in particular, we are engaged in looking at two proposals right now which we feel have commercial viability, and I am sure others do, so I think—we would believe that it might be a little more aggressive, and the reason for our belief that we would need to be more aggressive on LNG is the fact that we think these existing supply basins are declining a little bit more rapidly than the EIA is forecasting.

Senator BINGAMAN. I just would indicate that I was talking to the head of the BLM field office there in San Juan Basin last year, and he was indicating that they expect to drill, I think, 12,000 new wells over the next 15 years, but he indicated also that based on their estimates, they believe that the production in the San Juan Basin of natural gas, coal methane gas peaked 2 years ago and will be declining from now on, even with the drilling of 12,000 additional wells.

Mr. WELCH. Senator, could I make one more point that I think would back up what you are hearing there? I would refer to my

chart my colleagues have just put up, and what it shows on the left side there is the North American Basin cycle, and this particular one happens to be from the Gulf of Mexico, but if you look at any existing basin that we have been in for a long time, this is the trend you will see.

In 1950, when the first offshore wells were drilled, the average size of discovery that we were making was around 2,000 billion cubic feet. We found the biggest fields first. That is what you look for. Those are the easiest to find. Over time, the incremental reserves added per field gets smaller and smaller. Presently, we are finding only 10 to 15 billion cubic feet per field, so you would have to have an awful lot of fields to make up for one field that you would have back in the old days.

If you look at the slide on the right, you see the fundamental underlying decline rate from individual wells within a given basin, and you are seeing that wells that were drilled before 1994 in this particular chart show a flatter decline than those that have been drilled in 1998, and it is even steeper today. The reason for that is two-fold. One, we are drilling these wells in these smaller and smaller fields, and secondly the technology that we have in the oil and gas industry with respect to completions and well bore technology is incredibly advanced over where it was 10 years ago.

Today, we are able to produce a well that used to get 1 million cubic feet a day production, we can produce 20, so if you combine the fact that we are getting it out faster with the fact that there is less there, that is why you see increasing declines, and why, even though more and more wells are being drilled, the total output is not as great.

Senator BINGAMAN. That is very helpful. Thank you.

Senator THOMAS. This morning, we had a hearing with the Secretary talking about the budget and the money that is in there for enhanced recovery of oil, and the science and the research that can be done. Is there a potential here for having new techniques to recover gas?

Mr. Rattie.

Mr. RATTIE. The answer is yes, Senator, and, in fact, advances in technology have been the lifeblood of this industry since its inception.

I would like to comment just a little bit before I go to the technology issue, and I will make this connection as quickly as I can, but I recall back in 1976, when I was considering an opportunity to come into this industry or another one, there was a full page ad in the *Wall Street Journal*. It had a picture of a baby crying and the caption said, by the time this baby gets out of the eighth grade, America will be out of oil and gas.

Well, eighth grade would have come about 1988 for that child, and obviously we are not out of oil and gas. Advances in technology have continued to extend the resource base. We have produced over 500 trillion cubic feet of gas in this country since that article was written, and we have found more than 500. We have significantly grown the resource base, so I would not write off the industry in terms of its ability to develop the supplies that this country needs going forward.

Now, let me comment on research. This is an area that ought to be of concern for policymakers. Research used to be done by the companies, the bigger companies in particular. Belt-tightening and cost control have virtually eliminated the R&D effort. It now falls on the shoulders of the DOE and industry groups like Gas Technology Institute to do the collaborative research to evaluate some of these new technologies. It is important. We should continue to expect that advances in technology will help us get more out of our resource base.

Senator THOMAS. It seems sometimes kind of interesting that demand has gone up, from time to time the price has gone up, but the number of rigs has not gone up as much, and now it is high prices. How do you account for the fact that there seems to be more demand, very clearly, and yet the number of rigs does not go up?

Mr. WELCH. I will take a stab at that, Mr. Thomas. In fact, I spoke about it in my testimony before you were able to come in, but if you look at the 2000-01 price spike which is shown on this blue curve at the bottom there, you will see the green curve is the rig count, and the rig count actually doubled when prices spiked in 2001. We are seeing the rig count go up slightly now, but not nearly as significantly as it did, and part of it is because of the phenomenon I just described.

People put a lot of money out drilling these wells, and what we are finding is a decreasing marginal return on the investment, so it is indicating to me that the prospects in these older basins are becoming more and more marginal, and the real key to unlocking additional gas supplies is to get some of these areas where we need infrastructure in the Rockies, where we need a big pipe from Alaska, and where we need a Canadian frontier gas pipeline to connect us to the Canadian markets.

Senator THOMAS. Take home from the wellhead in some of the methane gas wells has varied from less than \$1 to over \$5. I think that has something to do with the rig count, does it not?

Mr. WELCH. Absolutely, and as you pointed out earlier, in that particular basin, the big issue is the transportation bottleneck, so you are getting gas-on-gas competition. People are just competing to get into the pipe. If you had an adequate take-away, you would expect those differentials and that volatility would be mitigated significantly.

Senator THOMAS. Well, it is a big problem, gentlemen, and I hope that we can—I am for having the marketplace be the major thing here, but we do have to have some policy, and I hope we can come up with some policy, whether it is gas, whether it is conservation, whether it is alternatives. Some even would suggest that, since gas is as useful in a variety of ways, that we ought to have more of our energy, electric energy being generated with nuclear or coal.

I understand the reason why they are having smaller generation plants closer to the market, rather than 2,000 megawatt plants that have to go quite a ways, but these are some of the kinds of policy things I think if we look ahead—and I appreciate what you all have said today. We do need to look ahead, because we know we will have to know what we are going to be doing 10 or 15 years from now.

So thank you so very much for coming. There may be some questions that will be submitted later, but we appreciate your being here. The committee is adjourned.

[Whereupon, at 3:35 p.m., the hearing was adjourned.]

APPENDIXES

APPENDIX I

Responses to Additional Questions

BP ALASKA-CANADA GAS,
Calgary, AB, Canada, March 17, 2003.

Mr. PETE V. DOMENICI,
Chairman, Committee on Energy and Natural Resources, U.S. Senate, Washington, DC.

DEAR MR. DOMENICI: In response to your letter of February 28, 2003, I am pleased to have the opportunity to address the questions raised by you and members of your committee following my testimony on February 25, 2003.

Please find enclosed our response to these questions. We stand ready to working further with your committee on this very important subject.

Sincerely

DAVID WELCH,
President.

RESPONSES OF DAVID WELCH

Question 1. It is my understanding that federal lands hold 80% of U.S. oil reserves and estimated 57% of gas reserves. A recent study produced by the Department of Interior and the Department of Energy evaluated the existing barriers to developing resources on federal land. The study found that 60% of the reserves located in the 5 western basins were available with standard restrictions. What is your opinion of this study and does it accurately reflect the challenges posed to producers? Do you believe these reserves can be counted on to respond in a timely fashion to future supply constraints like we have today? What can be done to improve access for gas pipelines on our federal lands in order to serve new gas production? What policy changes would you recommend?

Answer. Let me clarify by saying that I believe your question refers to undiscovered resources rather than proven reserves. While we have not conducted an independent study of restrictions on federal lands, the 1999 NPC study on North American gas seems to corroborate the estimate mentioned in the question. Specifically, the NPC study quoted that of estimated remaining resources (which includes both proved reserves and undiscovered resources) 59% are on lands with standard leasing restrictions, 32% are on lands with restrictions that could result in significant time delays and higher drilling costs, and 9% are completely inaccessible.

There are significant challenges to bringing on new supply even from the federal leases that have only standard restrictions. The supply sources from the western basins will tend to involve higher costs of development due to location and the need for significant new supporting infrastructure. Long lead times required for pipeline construction will tend to delay availability of these gas supplies. Collectively, these factors will tend to constrain the pace of gas supply growth from the western region.

Question 1b. It is my understanding that BLM and the Forest Service proposed a change to the valuation of pipeline Rights-of-Way fees. This proposal would have done away with the existing traditional linear fee rent method, in exchange for a method that would value the throughput in assessing the fee. What impact would this have on pipeline fees?

Answer. The existing methodology (valuation of pipeline Rights-of-Way fees) is preferred since it is well understood and lends itself to periodic review, if necessary. The throughput methodology adds costs to a pipeline that increasing the tariff, which in turn increases the cost to the consumer. It also adds a level of variability

and hence confusion to the market, because as production changes due to plants going down, etc. the tariff would also change.

Question 2. It is estimated that over 50% of our natural gas supplies lie under federal lands. I have heard from a number of producers who have been frustrated by the difficult and slow process in receiving access to federal lands. What has been the experience of pipeline companies in dealing with federal land managers? What do you recommend to improve this situation?

Answer. Securing federal access for gas pipeline projects requires significant regulatory processes, such as Environmental Impact Assessments, to be addressed before access may be granted. These processes can, at times, overwhelm Federal land managers, leading to delays in permitting. Expedient processes have been achieved on those projects where federal and state regulators have shared scarce resources by dividing the work efforts and by working closely with the entities involved. Dedicating a land manager to a large project, and making that person part of the project team, especially during critical stages of the project has also helped situations in the past.

Question 2b. There have been concerns regarding the price disparity of natural gas at the wellhead in the Rocky Mountains versus what is being charged at certain delivery points in the Midwest and East. It is my understanding that the lack of available pipeline capacity has contributed to higher prices. How widespread is this problem and where does this problem exist? What can be done to improve gas delivery?

Answer. As you surmise, the current lack of pipeline take-away capacity from the Rockies and San Juan basins has depressed Rockies and San Juan prices relative to Henry Hub and other markets further east. However, regional pipeline expansions have been proposed to help alleviate the situation. One in particular, the Kern River pipeline expansion which is due to be in service this summer, should help to ease constraints in a portion of the Rockies basin. The end result of adding more take-away capacity will be to better connect Rockies and San Juan gas supply to the North American market, narrowing differentials relative to other market hubs, and ensuring supply of gas to where it is most needed. In the same way an Alaska Gas pipeline would connect that 'stranded' gas resource to the North American market.

Question 3. Although the LIHEAP program is not within the jurisdiction of this committee, I am concerned about the impact the recent price spike will have on low-income consumers. Obviously, higher prices and the forecast for additional cold weather will put pressure on this program. Do you believe we could be more effective in making gas prices affordable by providing resources through LIHEAP or to provide incentives to increase production to relieve the supply constraints? What steps are American Gas Association member companies taking to help low-income consumers conserve energy?

Answer. As a producing company, our efforts are focused on developing new supplies of natural gas for North American consumers. To the extent that more of a commodity is available at any given level of demand, the price for that commodity will be reduced. Therefore, accessing new gas supplies that can be competitively delivered to the gas pipeline grid will be helpful to all North American consumers of natural gas. U.S. energy prices will always be subject to regional factors such as the extremes in weather recently experienced along the eastern seaboard. However, the peaks in demand created by these regional events, along with the associated price volatility, could be mitigated by increased access to supplies, such as Alaska and LNG. For example, LNG is the most fungible worldwide natural gas supply and increasing the number of LNG re-gasification terminals in the U.S. would be a way to help meet the increasing demand as well as directly addressing the price volatility that arises from regional events.

Question 4. EIA recently announced that U.S. gas production in 2002 fell by 2.3%. I understand the energy analysts such as CERA and EEA are predicting a further decline in 2003. Why is this occurring at a time when our natural gas inventories are low and prices are high? What financial challenges make it difficult to grow supply? Will the short-term capital crisis have long term effects on supply and infrastructure? Have the mergers and acquisitions that have taken place in recent years contributed in any way to lower drilling levels?

Answer. A lack of significant response in U.S. gas drilling activity as a result of recent high prices is the major reason why many third party energy analysts are predicting declining U.S. supply through 2003. Although gas prices have increased from \$US 4.00-6.00/MMBtu since the spring of 2002, U.S. gas rig activity has averaged only between 700-750 over that same time period. Due to time lags between drilling and production, no material increase in supply is expected later this year because of currently stagnated drilling activity. As a result, natural decline rates

within existing basins will prevail, resulting in a decrease in production throughout 2003.

The lack of rig response to the price increase has been due to a number of factors. First and foremost, producers are citing "a lack of quality prospects" as the main reason for limited exploration and production (E&P) activity; maturing traditional basins (such as Permian/Mid-continent) coupled with restricted land access rights to new supply areas (especially in the West) are resulting in fewer and smaller prospects for new exploration. Increased drilling activity during the previous price spike in 2000-1 yielded minimal additional prospects. Second, a number of financial and structural challenges have caused major E&P companies to reduce their 2003 capital budgets. The current investment climate has prompted many companies to allocate money to consolidating balance sheets and paying down debt as opposed to investing in new capital projects. Within the reduced capital environment, many global companies are choosing to spend capital dollars on investments where superior prospects or fiscal environment make investment more attractive. Finally, producers are concerned about the volatility in North American gas prices. A similar boom/bust cycle was witnessed in late 2000/early 2001; the sudden increase in prices followed by a severe price collapse at that time has led to speculation regarding the sustainability of current market prices.

Increasing exploration and production capital spending coupled with new pipeline infrastructure is required to ensure adequate supply is available to meet future demand. The short-term capital concerns will result in fewer companies stepping up to sponsor these new projects, on both the customer and the supplier end. Turmoil in the energy merchant sector has had a negative impact on many corporate balance sheets, including E&P companies as well as the parent companies of many prominent gas transmission firms. As a result, producers are spending their money to consolidate balance sheets (as mentioned earlier) while marketing firms and end-users (such as local distribution companies, industrials and power generators) have less of an appetite to sign long-term firm contracts to support new pipeline projects. Finally, pipeline companies are also dealing with solvency issues; meaning less capital is available to develop new pipeline projects. Due to the long lead times associated with major E&P and pipeline projects, a delay in development right now will result in a delay in new supply or infrastructure available over the long-term.

A record amount of merger and acquisition activity has taken place over the past few years. These new companies have consolidated assets as well as balance sheets, and revisited capital expenditure programs to ensure new company goals will be achieved. We believe that as merger and acquisition activity slows down and as balance sheets are shored up, drilling and production could become more of a focus for companies.

Question 5. Canada is our largest source of imported natural gas (15% of our total consumption). What are short term and long-term projects for Canadian supply and exports to the U.S.? What are the prospects for a pipeline from the Mackenzie Delta? How much of the gas from the Mackenzie Delta is likely to be used in Canada for the production of Alberta Oil Sands?

Answer. According to preliminary results from its recent supply and demand study, the National Energy Board (NEB) states that Canadian deliverability (which consists primarily of the Western Canadian Sedimentary Basin or WCSB and the East Coast of Nova Scotia) will remain relatively flat to slightly increasing over the short-term. The NEB's view of long-term Canadian deliverability differs depending on two major scenario drivers: technological development and action on the environment. In its "Supply Push" scenario, characterized by a low pace of technological development and low action on the environment, Canadian deliverability is expected to peak in 2010, and decline steadily thereafter. Conversely, in its "Techno Vert" scenario, characterized by a high pace of technological development and high action on the environment, Canadian deliverability is expected to increase steadily over the long-term. Overall, the pace of technological development in the E&P business will play a major role in enhancing future Canadian deliverability.

A consortium of Mackenzie Valley producers, led by Imperial Oil, is currently proposing to build a 1.2 Bcfd pipeline from the Mackenzie Valley area to interconnect with existing infrastructure within Alberta. The Mackenzie Valley Pipeline is expected to begin operations in 2008, at least three years ahead of any Alaska gas pipeline. Once in Alberta, a large portion of the Mackenzie Valley gas will be used to satisfy growing demand in Alberta's oil sands business as well as overall Canadian demand.

Question 6. According to a study by the NPC, increased U.S. natural gas consumption will require significant investment in new pipelines and other natural gas infrastructure—\$1.5 trillion over the next 15 years. However, the current level of volatility in natural gas markets (prices swinging from \$2.50 to \$10 mmbtu), has dis-

couraged many companies from committing to such long-term investments. In some cases, they cannot get financing. Where are the areas of greatest demand growth in the U.S.? Where are the areas of greatest supply growth? Is the pipeline infrastructure that currently exists adequate to move the gas where it needs to go to satisfy the market's supply/demand balance? What does this mean for the current system that we are so heavily dependent upon? What is the minimum level of investment necessary to insure adequate capacity, and how can we best achieve this?

Answer. The greatest area of U.S. demand growth is expected in the power generation sector, particularly in the Midwest, South Atlantic and Northeast regions of the country. In contrast, the greatest areas of traditional and frontier supply growth include the Rocky Mountains, the deepwater Gulf of Mexico, Canada and Alaska. Given the geographic disparity between growing supply sources and growing demand markets, more pipeline infrastructure will be required to ensure that future supply can access growing demand. The existing U.S. pipeline system is aging, and, as stated in the recently passed pipeline bill, ongoing investment will be required over the long-term to ensure public safety concerns are addressed. Above and beyond this, numerous infrastructure proposals are currently under development across the country, although it is unclear at this point just how much new capacity will ultimately be required.

In the short-term, gas price volatility will continue to increase as concerns over supply and long-term infrastructure development persist. However, the market has demonstrated an ability to balance supply and demand consistently over time. Continued rationalization in the energy merchant sector will help restore investor confidence and boost investment capital. Plus, ongoing communication between market participants and regulators will ensure adequate price transparency in the market as well as a streamlined process for future infrastructure development.

Question 7. Last Congress, as part of the energy bill, I worked on provisions intended to streamline the FERC process for granting a certificate for an Alaska natural gas pipeline and to provide some financial incentives to expedite construction. The EIA reviewed the provisions of the Senate Energy bill. The analysis indicated that the energy bill provisions would result in natural gas reaching consumers earlier than otherwise (i.e. between 2014 and 2020 instead of after 2020) and could reduce the cost of natural gas by up to \$0.32 an mcf.

Answer. We applaud the efforts of the last Congress to develop comprehensive energy legislation and for the inclusion of Alaska gas regulatory and fiscal provisions. As new energy legislation is considered, BP encourages the current Congress to capitalize on these past efforts and stands ready to inform this debate.

As to price impacts from Alaska gas coming into the North American market; we believe the lead-time associated with a project of this scale will have a minimal long-term impact on natural gas prices. Furthermore, we believe an Alaska gas pipeline project will have a stabilizing effect on the North American natural gas market.

Question 8. What is the time-line you foresee for an Alaska pipeline absent legislation and how would that change with the legislation?

Answer. There are many examples of pipeline projects being delayed due to a lack of regulatory priority and clarity. What could be achieved within two years has in some instances taken five years or more, or projects have been ceased altogether.

Absent the proposed regulatory and fiscal legislation, one result is crystal clear; a project will not move forward given current project economics, market dynamics and regulatory uncertainty. Without these provisions, I believe the project could be delayed, indefinitely.

The best-case scenario for an Alaska gas pipeline project, if regulatory and fiscal measures are enacted this year, is for gas to begin flowing in late 2011 with full rampup to 4.5 bcf/day in early 2012.

Question 9. This morning I asked the Secretary of Energy what the Administration was doing to mitigate the impact of high-energy prices. His only concrete response was that they support the Low Income Home Energy Assistance Program. The reality of the LIHEAP program is that historic funding levels have never met the needs of all of the eligible low-income households in the U.S. I would add that if gas prices are going to remain at these high levels many middle class households will need assistance as well. Do you think it is time that we expanded LIHEAP funding to a new level? Do you support the level passed by the Senate last year in the Energy Bill (\$3.4 billion per year)?

Answer. Please refer to my comments following question 3.

Question 10. Last Congress, as part of the energy bill, I worked on a provision that would have provided royalty relief for production of natural gas from marginal wells on federal lands. I am of the belief that it is crucial to keep marginal wells under production. Onshore oil and gas production from federal lands makes a sig-

nificant contribution to our domestic energy supply. Would you support granting royalty relief for marginal gas production?

Answer. As stated previously, we feel that the North American gas market will need all available sources of supply to meet future demand. Extending marginal well production is a positive step just as are other actions that encourage the development and importation of natural gas.

Question 11. A recent report on LNG (University of Houston, Institute for Energy, Law and Enterprise) notes that 8 federal agencies have some regulatory role over LNG—with the Coast Guard, DOT and FERC having major roles and DOE playing a coordinating role. I understand that the FERC has recently updated its policy on LNG facilities. It may be too early to tell how this division of responsibilities is working, but do you care to comment on the various agency roles and how well they work together?

Answer. BP believes new LNG supply will be needed to meet the growth in demand for natural gas in North America. We remain committed to working with the relevant federal and state agencies to secure new LNG supply for the nation and appreciate the constructive working relationship we believe we have with each one of these agencies.

Question 12. How confident are we in our ability to collect data about the supply of natural gas? What amount do we think is being flared? Does the EIA have adequate funds to perform the data gathering tasks demanded?

Answer. As the largest natural gas producer in North America, BP makes a concerted effort to understand its business and collect industry data to monitor natural gas supply and demand. This data is published annually in the “BP Statistical Review of Energy”, available at www.bp.com. As a producer, we are aware and track flaring from our own fields, but cannot comment on the amount of gas flared by the entire industry. On that note, in 1998 BP set out to reduce its company-wide emissions to 10% below 1990 levels by 2010, and announced last year that it had achieved this goal, some 8 years early.

Question 13. President’s Energy Plan announced last March predicted that between 1300-1900 new power plants would need to be built to meet future energy demands. At the time, experts predicted a large percentage of these would be natural gas driven. Given the current volatility in natural gas markets, some fear that a large number of these plants will never be built. Instead, future electricity demands may in fact be met by large Midwestern coal plants which would be built using old, dirty technology. Do you agree with this? Does the current level of volatility discourage new gas fired generation from being built? Also, to what degree are delays in pipeline development perhaps leaving the door open for alternate fuels?

Answer. Over the last three years, the U.S. has seen an unprecedented increase in generating capacity—the vast majority has been gas-fired. 2003 will continue to see significant new generating capacity additions as plants currently under construction are completed. Few, if any, coal-fired power plants are under construction due to the high capital costs and environmental constraints. As a result of the increase in generating capacity over the last three years, generating reserve margins (unused available capacity) have increased rapidly as capacity additions have outstripped demand growth.

Current high gas prices are partly a product of high oil prices. Lower oil prices would see gas prices moderate as a result of inter-fuel competition. In addition, the current price volatility reflects a market in transition from a long period of over supply. In the longer term, the equilibrium price is likely to be at a lower level than today’s prices. There is plenty of economic gas supply available at prices that would allow gas to compete effectively with new-build coal fired-plan, including gas from Alaska, the Rockies and LNG.

Current, high and volatile gas prices and high reserve margins are resulting in a number of proposed power plant projects being postponed or withdrawn. However, given the capacity additions already in place and under construction, the vast majority of incremental power demand over the next decade will be supplied by gas-fired power plant.

Pipeline investment is driven by market signals—when the differential between pricing points indicates the demand for additional pipeline capacity. In this way, pipeline investment has historically been made according to market demand and there is no indication that this process has disadvantaged gas.

No one, including producers, likes high prices or price volatility because they do not produce market dynamics conducive to predictable investment.

Question 14. What is the role of natural gas storage in North America and how is this changing?

Answer. The role of natural gas storage in the North American market is to balance supply and demand during peak times (namely the winter heating season). A

typical reservoir storage facility injects gas into the reservoir during the summer months (April to October) and withdraws gas to meet demand in the winter months (November to March). Local distribution companies and pipeline companies use storage to balance customer demand as well as to maintain the operational integrity of their respective systems. The emergence of increased power generation demand for gas during the peak summer months has resulted in an increased need for high deliverability storage. Customers are interested in more cycles per year as well as higher peak deliverability, which have renewed focus on salt dome storage development. New capital investment from non-traditional storage operators has been an important source of new infrastructure development.

Question 15. The United States is currently facing low levels of gas inventories. Given this, do you think we need to tap into new sources of gas such as the Alaskan gas reserves and liquefied natural gas (LNG)? What do you think is the best source for new inventories of natural gas?

Answer. Yes, all new sources of supply including Alaska, the Rockies and LNG will be needed to meet the growth in North American demand for natural gas. LNG will provide "peakloading" to reduce volatility during times of exceptional demand.

Alaska clearly offers the largest domestic source of new supply to meet projected demand and for that reason we believe it should be given sufficient consideration. New LNG receiving terminals and Rockies development will provide smaller, incremental volumes.

Question 16. How should the United States work with Canada and Mexico to ensure we increase our gas supply at competitive prices?

Answer. The U.S. government, through the Department of State, has a regular and ongoing energy dialogue with the governments of Canada and Mexico where the participants collectively examine North American energy needs. This forum is intended to establish a common understanding of continental energy needs. We encourage the U.S. Government to continue these engagements and to consider a special session dedicated to natural gas supply issues. Close cooperation with Canada and Mexico is essential to fostering new sources of gas supply such as frontier gas in Alaska and Canada and LNG.

Question 17. How will construction of the Alaska Natural Gas Pipeline affect Kentucky? How much gas is it expected to provide the United States as a whole?

Answer. Energy consumers in the state of Kentucky have typically enjoyed low energy prices owing to the presence of readily available energy resources such as coal. However, Kentucky currently consumes about two and one-half times the natural gas that it produces each year. And Kentucky is just one of thirty-eight states which are net consumers of natural gas. New sources of gas will be required as America's demand for inexpensive, clean-burning natural gas continues to grow.

An Alaska gas pipeline will provide benefits to Kentuckians beyond just improving the nation's energy supply situation. Kentucky, as one of the top four auto producers in the nation, will be in prime position to capitalize on the light truck (~1300) and heavy duty vehicle (~1000) supply opportunities created by the Alaska gas pipeline project. Among new business opportunities for Kentucky's manufacturing sector could include manufacture of pipe laying equipment (~\$900 million opportunity).

AMERICAN GAS ASSOCIATION,
Washington, DC, March 17, 2003.

Hon. PETE DOMENICI,
Chairman, Senate Energy and Natural Resources Committee, Dirksen Senate Office Building, Washington, DC.

DEAR MR. CHAIRMAN: Thank you for the opportunity to appear before the Senate Committee on Energy and Natural Resources on February 25, 2003 to give testimony regarding natural gas supply and prices.

Enclosed please find our answers to the questions that were submitted subsequent to the hearing.

Sincerely,

ROBERT W. BEST,
Chairman, President and CEO
Atmos Energy Corporation.

RESPONSES TO QUESTIONS FROM SENATOR DOMENICI

Question 1a. It is my understanding that federal lands hold 80% of U.S. oil reserves and estimated 57% of gas reserves. A recent study produced by the Department of Interior and the Department of Energy evaluated the existing barriers to

developing resources on federal land. The study found that 60 percent of the reserves located in the 5 western basins were available with standard restrictions.

Question 1b. What is your opinion of this study and does it accurately reflect the challenges posed to producers?

Answer. I have no reason to believe that the study is inaccurate from a factual perspective. However, I think people have a tendency to view this glass as “half full,” and I am convinced it is “half empty”. In a gas market as tight as we have today, restricting 40 percent of the reserves beyond standard restrictions is devastating. When markets are tight even “minor” alterations in supply or demand can have dramatic impacts on price—a point evidenced this winter and in 2000-2001.

I would also point out that standard restrictions do not imply no problems. Leases being worked in areas with standard restrictions are subject to a variety of constraints that could be reduced in an effort to streamline the process. We need to make it easier to get all of this gas to market more quickly, regardless of the DOI/DOE classification.

Question 1c. Do you believe these reserves can be counted on to respond in a timely fashion to future supply constraints like we have today?

Answer. I do not believe the situation gas consumers faced in 2000-2001 and that they face today are acceptable. Prices are relatively high because supply is having trouble keeping pace with demand. I believe that gas can be produced in an environmentally sensitive fashion, and we must make it less cumbersome for producers to access reserves in order to respond to demand in a timely fashion. Today it is not possible.

Question 1d. What can be done to improve access for gas pipelines on our federal lands in order to serve new gas production? What policy changes would you recommend?

Answer. AGA member companies, particularly those in the West, have considerable experience in siting natural gas distribution lines and intrastate pipelines on federal lands. AGA has, over a period of years, also discussed these issues with other stakeholders in the industry. While siting infrastructure on federal lands has its own unique problems, they are merely a subset of the problems that are regularly faced in siting natural gas infrastructure in the United States generally. In broad-brush fashion, the difficulties are two-fold: (1) The multiplicity of federal, state, and municipal authorizations that are required to site natural gas infrastructure, in which duplicative information is regularly collected and in which consecutive, rather than concurrent, review processes are the norm. (2) The absence of binding time frames in which these reviews are to be completed.

AGA has participated in two formal sets of discussions over the last several years addressing these issues. The first, which was sponsored jointly by the Interstate Oil and Gas Compact Commission and the National Association of Regulatory Utility Commissioners, resulted in a report dated July 2001 that addressed the types of difficulties that have been confronted and suggested several means to address them. A similar process was undertaken by energy industry stakeholders under the auspices of the Keystone Center in Colorado. That collaborative also produced a report dated March, 2002 addressing the difficulties involved and making policy recommendations. Copies of both reports are attached to these answers.*

Several months ago, FERC signed a memorandum of understanding with nine other federal agencies, including the Bureau of Land Management, the Fish and Wildlife Service, and the Environmental Protection Agency. The goal of the MOU is to make the permitting process less onerous for pipelines. These agencies have committed to review pipeline construction applications concurrently, rather than consecutively. This process has promise. AGA encourages Congress to encourage the signatories to this MOU to commit to this process, perhaps by codifying the MOU.

Question 1e. Rights of Way—It is my understanding that BLM and the Forest Service proposed a change to the valuation of pipeline rights-of-way fees. This proposal would have done away with the existing traditional linear fee rent method, in exchange for a method that would value the throughput in assessing the fee.

Question 1f. What impact would this have on pipeline fees?

Answer. I believe that the proposed change would significantly increase the cost of gas to the consumer and that this would be extremely unwise. A study prepared by the INGAA Foundation supports this conclusion.

Question 2a. It is estimated that over 50 percent of natural gas supplies lie under federal lands. I have heard from a number of producers who have been frustrated by the difficult and slow process in receiving access to federal lands.

Question 2b. What has been the experience of pipeline companies in dealing with federal land managers?

*The reports have been retained in committee files.

Answer. The overriding complaint from both producers and pipelines with respect to federal land is that jurisdictions overlap, and dealing with multiple federal and state agencies is time consuming and expensive. Multiple permits are required for these projects, and guidance from the various agencies involved is often slow and sometimes contradictory.

Question 2c. What do you recommend to improve this situation?

Answer. In addition to the items cited in 1d above, one step in the right direction was the recently signed MOU between FERC and nine other federal agencies aimed at a more coordinated pipeline permitting process. We are hopeful but would encourage the Congress to ensure that the agencies do not retreat from the intent of this action. We would also like to see the relevant agencies pursue right-of-way corridors for pipeline projects that would allow for expedited approvals. If expedited approval was a reality in these corridors, pipelines would have an incentive to utilize them.

Question 2d. There have been concerns regarding the price disparity of natural gas at the well head in the Rocky Mountains versus what is being charged at certain delivery points in the Midwest and East. It is my understanding that the lack of available pipeline capacity has contributed to higher prices.

Question 2e. How widespread is this problem and where does it exist?

Question 2f. What can be done to improve gas delivery?

Answer. See the responses to 1d and 2c above.

Question 3a. Although the LIHEAP program is not within the jurisdiction of this committee, I am concerned about the impact the recent price spike will have on low income consumers. Obviously, higher prices and the forecast of additional cold weather will put pressure on this program.

Question 3b. Do you believe we could be more effective in making gas prices affordable by providing resources through LIHEAP or to provide incentives to increase production to relieve supply constraints.

Answer. You correctly note that recent natural gas price levels will place pressure on the LIHEAP program. As I noted at the hearing before the Committee, most local distribution companies have hedged a portion of their gas supply, by injecting natural gas into storage in the summer, by entering into fixed-price gas purchase contracts, by purchasing futures contracts, or by using various financial instruments. Thus, current price increases for natural gas will tend to be moderated somewhat at the consumer level. Despite utility efforts to moderate price increases by portfolio purchasing and use of hedging, continuing higher natural gas prices inevitably show up in consumer bills. Inevitably, to one extent or another, higher prices will put pressure on the LIHEAP program. As you know, notwithstanding authorized and appropriated levels for LIHEAP, the funding available has not come close to meeting needs.

AGA believes that the goal of affordable energy for all Americans, including low-income Americans, is best served by providing reasonable, targeted incentives to bring forth natural gas supply. Every dollar saved by low-income Americans on their energy bills translates directly into a dollar less needed for LIHEAP funding. AGA believes that Americans can save real, significant dollars through natural gas production incentives that are measured in cents rather than dollars. This is a good policy tradeoff for the nation, for the economy, and for low-income energy consumers as well.

There will always be a need for LIHEAP protection of the low-income consumer. At the same time, production incentives can increase supplies and make gas more affordable for all consumers. LIHEAP protection is critical for the disadvantaged and necessary, while increased supplies are necessary to ensure reasonable prices, economic growth, environmental protection and the achievement of national energy security.

Question 3c. What steps are American Gas Association member companies taking to help low income consumers conserve energy?

Answer. AGA represents 191 local utilities, and the programs they offer are extensive and varied. Our members provide their customers with information on high-efficiency appliances and techniques to reduce energy consumption, they offer convenient financing for these appliances and weatherization programs, they fund related research and perform energy audits. According to the LIHEAP Clearinghouse, energy utilities spent \$100 million in FY 2001 on customer weatherization programs. An indicator of the success of these programs is the fact that residential gas consumption per household decreased by 21 percent from 1980 through 2001 and commercial gas consumption per customer decreased by 18 percent from 1979 to 1999.

RESPONSES TO QUESTIONS FROM SENATOR BINGAMAN

Question 4a. EIA recently announced that U.S. gas production in 2002 fell by 2.3%. I understand that energy analysts [such as CERA (Cambridge Energy Research Associates) and EEA (Energy and Environmental Analysis)] are predicting a further decline in 2003.

Question 4b. Why is this occurring at a time when our natural gas inventories are low and prices are high?

Answer. I believe producers are having a difficult time increasing production in mature fields. In order to increase supplies and develop a market more responsive to consumer needs we must look to new areas of supply and new forms of supply. We have relied on the same supply sources for decades and it is inevitable that production declines will occur. There has been some movement into the Rocky Mountains in terms of production, but a further migration is needed to deeper waters in the Gulf as well as to those areas where offshore access is currently denied. Additionally, gas from Alaska and in the form of imported LNG must be vigorously pursued.

Question 4c. What financial challenges make it difficult to grow supply?

Answer. A real difficulty in this industry is matching short-term and long-term needs. We must make investments today in order to meet demand years from now. Additionally, we must convince both lenders and regulators that the investments we are making are prudent and necessary.

Question 4d. Will the short-term capital crisis have long-term effects on supply and infrastructure?

Answer. In order to meet growing gas demand, hundreds of billions of dollars must be invested in production, transmission and distribution facilities. This is a very difficult proposition in light of current market conditions and economic uncertainty. Any actions that reduce risk, uncertainty and infrastructure construction time will reduce costs that are ultimately borne by the consumer.

Question 4e. Have the mergers and acquisitions that have taken place in recent years contributed in any way to lower drilling levels?

Answer. The producing sector would be in a better position to respond to this question.

Question 5a. Canada is our largest source of imported natural gas (15% of our total consumption)

Question 5b. What are short and long term projections for Canadian supply and exports to the U.S.?

Answer. Canadian production faces many of the same hurdles as does U.S. production. In particular, production in mature areas of Western Canada has slowed similar to key producing areas in the U.S. However, the Canadians have been more proactive in allowing the development of non-traditional producing areas such as the offshore Atlantic and the Mackenzie Delta-Beaufort Sea areas. While it would not be wise to assume that Canadian successes will necessarily continue to satisfy growing U.S. demand, it would be wise to emulate their willingness to explore new production frontiers.

Question 5c. How much of the gas from the Mackenzie Delta is likely to be used in Canada for the production of the Alberta oil sands?

Answer. Many analysts believe that most of the gas from the Mackenzie Delta will be used for this purpose rather than for export to the U.S. However, I think that it is premature to conclude this—relative market needs and prices in the U.S. and Canada will ultimately decide the destination for this gas.

Question 6a. According to a study by the NPC, increased U.S. natural gas consumption will require significant investments in new pipelines and other natural gas infrastructure—1.5 trillion over the next 15 years. However, the current level of volatility in gas markets (price swinging from \$2.50 to \$10 mmbtu), has discouraged many companies from committing to such long-term investments. In some cases, they cannot get the financing.

Question 6b. Where are the areas of greatest demand growth in the U.S.?

Answer. Growth is anticipated in all geographic areas of the country and for all consuming sectors. However, the demand for electricity generation will be the largest single source of new gas demand in the coming years. Growth for electricity generation and natural gas demand will be particularly strong in the Southeast, the Southwest and the Midwest.

Question 6c. Where are the areas of greatest supply growth?

Answer. In the near term, most supply growth is anticipated in the Rocky Mountains and potentially the deepwaters of the Gulf of Mexico. In the three to five year time frame there are also potential supply sources from many coastal areas via LNG. Alaskan gas has a 10 year time frame.

Question 6d. Is the pipeline infrastructure that currently exists adequate to move the gas where it needs to go to satisfy the market's supply/demand balance?

Answer. Pipeline and distribution system infrastructure will have to increase dramatically in most areas of the country to serve a demand increase that could approach 50 percent over the next 15 to 20 years. The most glaring lack of infrastructure is for pipeline capacity to move gas out of the Rocky Mountain Region, although a number of projects are being constructed or planned to address this issue. It is a problem that we have known about for a long time, but addressing it has been too slow and arduous.

Question 6e. What does this mean for the current system that we are so heavily dependent upon?

Question 6f. What is the minimum level of investment necessary to insure adequate capacity, and how can we best achieve this?

Answer. Natural gas utilities will need to spend \$100 billion by 2020 to meet projected demand growth, excluding the funds required for normal safety and maintenance activities. Attracting this amount of capital will be a very difficult challenge for utilities. One action that would bring utilities more in line with other industries in this regard is accelerated depreciation from the current 20 year level allowed for pipeline and distribution infrastructure additions. Although utilities compete for capital with other industries, their allowed depreciation schedule is much less favorable. Expedited review and approval of system expansions will also serve to add infrastructure more economically.

Question 7a. This morning I asked the Secretary of Energy what the Administration was doing to mitigate the impact of high energy prices. His only concrete response was that they support the Low Income Home Energy Assistance Program. The reality of the LIHEAP program is that historic funding levels have never met the needs of all of the eligible low-income households in the U.S. I would add that if gas prices are going to remain at these high levels many middle class households will need assistance as well.

Question 7b. Do you think it is time that we expanded LIHEAP funding to a new level? Do you support the level passed by the Senate last year in the Energy bill (\$3.4 billion per year)?

Answer. AGA and its member companies enthusiastically endorse increased LIHEAP funding as authorized by the Senate last year in H.R. 4. You are quite right in noting that, at current levels of funding, the LIHEAP program does not approach meeting all the human needs it is intended to serve.

You also correctly note that this year's higher natural gas prices will increase the needs for LIHEAP funding. In addition to higher levels of LIHEAP funding, these needs can be addressed by taking decisive action in the very near term to increase natural gas supply, which will help moderate natural gas price levels.

Question 8a. Last Congress, as part of the energy bill, I worked on a provision that would have provided royalty relief for production of natural gas from marginal wells on federal lands. I am of the belief that it is crucial to keep marginal wells under production. Onshore oil and gas production from federal lands makes a significant contribution to our domestic energy supply.

Question 8b. Would you support granting royalty relief for marginal gas production?

Answer. AGA supports royalty relief for marginal production. AGA supports, and has supported, an array of targeted, reasonable incentives to bring forth more natural gas supply. These include Section 29 tax credits, expensing geological and geophysical costs, expensing delay rental payments, tax credits for marginal wells, five-year net operating loss carryback, and temporary repeal of the Alternative Minimum Tax for intangible drilling costs.

Question 9. A recent report on LNG (University of Houston, Institute for Energy, Law & Enterprise) notes that 8 federal agencies have some regulatory role over LNG—with the Coast Guard, DOT and FERC having major roles and DOE playing a coordinating role. I understand that the FERC has recently updated its policies on LNG facilities. It may be too early to tell how this division of responsibilities is working, but do you care to comment on the various agency roles and how well they work together?

Answer. The pattern of multiple agencies with responsibility over energy infrastructure is almost universal in our industry. Similar patterns apply with regard to natural gas production, transmission, and distribution. With respect to LNG in particular, siting in a timely fashion is the critical concern, and agency overlap invariably leads to delays. Our concern is that LNG terminal siting may become an even longer process.

It is quite clear that LNG will play a critical role in natural gas supply in the future. In addition to bringing forth additional supply, it will have a very significant

role in pricing at the margin. AGA endorses the recently announced FERC policy with regard to LNG offloading facilities. The new FERC policy will not adversely affect consumer protection, and it will increase regulatory certainty for developers of new LNG offloading facilities.

Question 10a. How confident are we in our ability to collect data about the supply of natural gas?

Answer. Data on natural gas supplies are limited and not timely. Other than the weekly natural gas storage data that EIA overtook recently from AGA, there are little real-time data. Further, there is little or no consistency between the federal and state supply data.

Question 10b. What amount do we think is being flared?

Answer. Virtually no natural gas is flared today.

Question 10c. Does EIA have adequate funds to perform the data gathering tasks demanded?

Answer. This is beyond our area of expertise. However, we have noted a number of indicators (delayed reporting, extensive revisions, etc.) that suggest resource constraints.

Question 11a. The Presidents Energy Plan announced last March predicated that between 1300-1900 new power plants would need to be built to meet future electricity demands. At the time, experts predicted a large percentage of these would be natural gas driven. Given the current volatility in natural gas markets, some fear that a large number of these plants will never be built. Instead, future electricity demands may in fact be met by large Midwestern coal plants which would be using, dirty technology.

Question 11b. Do you agree with this?

Answer. Gas has become the fuel of choice for electricity generation because gas plants are clean, efficient, quicker to construct, economic and flexible to operate. Clearly developers are examining the coal option as a result of gas pricing concerns. However, it is very difficult and costly to meet all the environmental concerns related to coal. It is unfortunate that governmental policies overwhelmingly drive electricity generators to gas but at the same time impede our ability to produce and deliver gas from our vast resources.

Question 11c. Does the current level of volatility discourage new gas fired generation from being built?

Answer. Natural gas remains the dominant fuel choice for new generating capacity, although the dominance has been reduced marginally over the past couple of years, primarily in response to gas pricing concerns.

Question 11d. Also, to what degree are delays in pipeline development perhaps leaving the door open for alternative fuels.

Answer. We need to pursue all forms of energy and I do not know that there is any correlation between pipeline development and the development of alternative fuels. I do know that there are 64 million natural gas customers in the U.S. today, and that less than one-half of one percent of our energy needs are currently met by solar, wind or other renewable sources. We need to do all we can to supply the 64 million gas customers as efficiently and cost-effectively as possible while also moving forward aggressively on the renewable front. Renewables offer hope for tomorrow but not relief today.

RESPONSES TO QUESTIONS FROM SENATOR BUNNING

Question 12a. What is the potential for coal mining on federal lands?

Answer. This is not our area of expertise.

Question 12b. How much coal is available to be mined on federally owned land?

Answer. This is not our area of expertise.

Question 12c. Is coal on federal lands available for mining in the eastern United States? If so, where is it available where the Federal government owns the rights to the coal?

Answer. This is not our area of expertise.

Question 13. How do you think federal laws should be changed to best bring about a balanced energy policy that will boost domestic energy production while also promoting conservation?

Answer. AGA and its members companies are extremely attuned to the need for the nation to implement a balanced energy policy. On a national basis, we have seen per-customer consumption of natural gas declining, largely as a result of conservation measures. Nevertheless, we have also seen the natural gas market as whole grow. Increases in the market of as much as 50 percent are in the foreseeable future.

AGA believes that H.R. 4 as passed by the House of Representatives in August 2001, represents an appropriate balance among the multitude of factors to be considered in crafting a national energy policy, including energy supply and energy conservation.

Question 14. What are some of the obstacles in current regulations that have prevented the United States from boosting its energy production on federally owned lands?

Answer. AGA would defer to the natural gas producer community with regard to this question. Nevertheless, we also direct your attention to AGA's response to Question No. 1 above.

APPENDIX II

Additional Material Submitted for the Record

NATIONAL ASSOCIATION OF MANUFACTURERS,
Washington, DC, February 24, 2003.

Hon. PETE V. DOMENICI,
*Chairman, Energy and Natural Resources Committee, Hart Senate Office Building,
Washington, DC.*

DEAR MR. CHAIRMAN: On behalf of the National Association of Manufacturers (NAM), I would like to make clear to the Committee on Energy and Natural Resources the seriousness with which the NAM views the need for having access to adequate supplies of natural gas at affordable prices. The NAM is the nation's largest industrial trade association and represents 14,000 members, including 10,000 small and medium companies.

The manufacturing sector (excluding electric generation) uses about one-third of the nation's energy, including 40 percent of its natural gas and 30 percent of its electricity. Many industries are heavily impacted when natural gas prices rise, most particularly the chemical and fertilizer industries, which use natural gas as both an energy source and a feedstock for their products. In addition, natural gas has unique properties to heat and to dry and is used extensively to melt scrap aluminum and steel ingots, for paint drying for cars and appliances, in making glass and in heat-treating metals. In addition, natural gas is used in many facilities for space heating and the steam is necessary for many manufacturing processes. In hundreds of larger facilities, that steam is recycled to generate very economical electricity by means of combined heat and power systems.

Finally, increased natural gas costs have a double impact on gas-using manufacturers. Because increasing volumes of natural gas are being consumed to generate electricity, the competition for tight supplies means that consumers' electricity costs will also rise. In fact, the largest energy input cost for the manufacturing sector is electricity. Thus, natural gas price increases are being felt by virtually all manufacturers, irrespective of their product lines.

Manufacturing is on the front line in the unprecedented competition we are seeing in the world marketplace. More and more frequently, domestic manufacturers cannot pass through cost increases on their products, making it more difficult to stay competitive in the United States or sell into the export market. Our analysis shows that weak exports, coupled with low capital investments, are prolonging the anemic recovery in the manufacturing sector. The economic situation in the manufacturing sector is serious, after experiencing 30 straight months of employment decline that has totaled two million net jobs lost in the past two years. Anything the federal government can do to increase natural gas supplies at affordable prices, while avoiding mandates that would drive up the cost of natural gas or electricity, will help to reduce product costs and improve the condition of U.S. manufacturing and its millions of workers.

As the members of the committee may know, the spike in prices for oil, natural gas and electricity in the fall of 2000 precipitated the manufacturing recession, although they were not the only causes. The wellhead price of natural gas in January 2000 reached over \$8.00 per million Btu, more than four times the average for the previous ten years, which was \$1.91. Not surprisingly, that was the first month in recent history that the United States was a net importer of basic chemicals. Moreover, high domestic natural gas prices affect electricity prices as well, because natural gas is increasingly used to generate electricity. In fact, natural gas use in electric generation increased by over one-third (35 percent) between 1990 and 2001. Because electricity generation itself has increased, the volumes of natural gas used in electricity production grew by two-thirds (66 percent) during this same period of 1990 to 2001. Given that domestic production of natural gas in 2001 was less than 9 percent higher than in 1990, while overall domestic consumption of natural gas

increased more than 18 percent, we are concerned about the price and reliability of this important energy source into the future.

Although, there was an initial boost in U.S. natural gas production following the high prices of 2001, domestic gas production has fallen for the last three quarters. Moreover, this first cold winter in several years, steady population growth and steady, although anemic, economic growth have used up the temporary increase in domestic natural gas production. Thus, by the end of January 2003, the wholesale price of natural gas was over \$6.00, which is more than three times the average price from 1991 to 1998. Once again, supplies are tight and prices have been streaking upward. One natural gas price spike in twenty years might be considered an anomaly, but two might be feared as a trend.

In August 2000, the NAM raised its members' concerns about the impending natural gas supply crisis and the high prices during that winter proved their concerns valid. The new Administration quickly produced a National Energy Policy, and asked Congress for comprehensive energy legislation. Many valuable elements of a final bill were agreed to only to fall victim to the elements of disagreement as the 107th Congress ended.

We must observe, however, that conservation mandates are not the right solution. They add to manufacturing costs without providing commensurate economic benefits. Industry has been steadily increasing the efficiency with which it uses energy since the mid-1970s. Manufacturing has been focusing on cost cutting, including ways to reduce energy use, through its implementation of Total Quality Management procedures that became common in industry during the 1980s and continue today. Although perhaps well-meaning, mandatory energy reductions only divert capital that is in short supply to investments in ventures that go beyond those that are economically sound, or worse, stop economic activity altogether.

Accordingly, the NAM strongly opposes a renewable portfolio standard as a solution to the rapid growth in the use of natural gas in electric generation. Some renewable energy sources, such as wind and solar, are unreliable and very expensive. If renewable portfolio standards are adopted, the costs of generating electricity will rise just as if there was a new tax on electricity. These costs will be passed on as a new energy cost to manufacturers, as well as home owners, commercial and state and local governments. Let me remind the committee that the recent economic downturn hit manufacturers much harder than the rest of the economy both in terms of depth and duration.

Manufacturers began slipping into recession in the second quarter of 2000—well ahead of the rest of the economy. And by the time that manufacturing output began to turn up in the beginning of 2002, industrial output already had fallen by 8 percent over the previous 18 months. This performance was much worse than that of the rest of the economy. Overall, GDP slipped less than half a percent during the first three quarters of 2001—the second-mildest recession in 50 years.

And while the overall economy grew a modest 3 percent last year, manufacturing output edged up only 1.7 percent. This manufacturing “recovery” is slower than the first year of any recovery over the past 40 years and less than one-fifth the average 10 percent growth during the initial 12 months of the past six expansions.

Weak business investment demand and export growth have constrained the recovery for manufacturers, the producers of capital goods used by American industry and the source of two-thirds of overall exports. In short, the expansion to date has been narrow, unbalanced and historically sluggish. Despite historically low interest rates, and a bonus depreciation stimulus package passed last year, significant inhibitors to economic growth remain. Some of the challenges facing manufacturers are long-term problems that need to be addressed to create a better environment for manufacturing in America.

Energy prices are not the only concern to industry executives when considering where to put their investment dollars. Certainly, the still-overvalued U.S. dollar, abusive product liability litigation, skyrocketing health-care costs and an unfavorable tax climate are other major factors. But, because none of these costs can be easily endured, all of these costs including energy count to whether a company is profitable or not. Since July 2000, manufacturing employment has fallen by 2 million over the course of 30 consecutive monthly declines. By contrast, the employment in the rest of the economy has grown by 954,000, with a brief, sharp drop in employment immediately following September 11 sandwiched between months of modest employment growth.

We applaud this committee's declaration that it will act promptly and expansively on a new comprehensive energy bill that will address the need for energy to renew industrial economic growth. It is vital that the 108th Congress act quickly to stem the national energy crisis by implementing legislation that provides for adequate supplies of reliable and affordable energy. There is an obvious and undeniable need

for Congress to provide additional access to federally controlled lands that clearly contain significant natural gas resources.

We request that this letter be made part of the record during the full committee hearing on gas supply and prices. If you have any questions, please have your staff contact Mark Whiteman at (202) 637-3157. Thank you.

Sincerely,

MICHAEL E. BAROODY,
Executive Vice President.

ARCTIC RESOURCES COMPANY,
Houston, TX, February 24, 2003.

Hon. PETE DOMENICI,
Chairman, Senate Energy and Natural Resources Committee, Dirksen Senate Office Building, Washington, DC.

DEAR CHAIRMAN DOMENICI: I understand that, as part of your efforts to draft and pass a comprehensive energy bill this year, your Committee is holding a hearing on February 25, 2003 on Natural Gas Supply and Prices. I would like to submit for the official hearing record the attached testimony on behalf of Arctic Resources Company. The testimony details the importance of allowing free markets to work in construction of a natural gas pipeline from Alaska's North Slope to the lower-48 states.

I appreciate your consideration of this request, and I look forward to working with you and the Committee to ensure that appropriate legislation is enacted to expedite permitting and construction of a North Slope pipeline route that the market chooses and without subsidies.

Sincerely,

FORREST E. HOGLUND,
Chairman & CEO.

STATEMENT OF FORREST HOGLUND, CHAIRMAN & CEO, ARCTIC RESOURCES COMPANY

Mr. Chairman, Members of the Committee: I represent Arctic Resources Company (ARC), a special purpose company formed to develop and build a natural gas pipeline connecting the natural gas reserves of the North Slope of Alaska and the Canadian Northwest Territories for delivery to Canada and the lower-48 states. The route we are proposing is the shortest, fastest and most economic option. This route, which is often referred to as the Northern Route, will also tap into the enormous future reserve potential of Alaska and the Canadian Arctic, and is the most environmentally responsible route to achieve that objective.

I understand that the purpose of this hearing is to receive testimony on natural gas supply and prices in the U.S. today, and in the future. Our country is facing a shortage of natural gas and prices of the fuel are rising. In order to meet future energy requirements, it is vital to develop our vast domestic natural gas supplies on Alaska's North Slope as quickly and economically as possible. This testimony will provide the Committee with a status report on our project; but first, let me address the need to streamline the permitting process to make it as efficient as possible.

To expedite the construction of a natural gas pipeline from Alaska, I suggest that Congress pass legislation to set timetables for regulatory and environmental approvals and consider legislation for a government guarantee of debt to allow for additional capacity to be built and to give incentives for producers to commit their gas to the project. I firmly believe that we can complete the Northern Route without either of these actions; but, that type of legislation would undoubtedly speed the process and lower the risks of the project.

ARC does not need subsidies or tax breaks to implement the northern gas pipeline project, and we urge Congress to reject any unnecessary subsidies for any pipeline project. We need more than legislation from Washington. What we need and what the country needs is for government to let the markets work and allow the natural gas and associated industries in Alaska, Canada and the lower-48 United States to develop the pipeline project in an economically rational manner. We need those who would mandate routes to stand down from their efforts, and instead focus on providing a clear opportunity for expeditious permitting of the most cost effective route.

Current market conditions should foster the expeditious development of an economic pipeline. We believe that the market will support the development of the Northern Route and that route can fulfill the needs of Alaskans, the needs of our Canadian neighbors, and help meet the growing natural gas demand in the lower-48.

To be successful, however, the U.S. and Canada must work closely together. The two governments must be committed to the lowest-cost system and accessing the largest supply base. Government decision makers and business, civic, social and environmental leaders must not limit their perspective to a 25-year-old, second-best answer. We must be open to consideration of a third party consortium of interested parties to oversee the project in order to overcome the many real and imagined challenges to this project.

As is evident in this testimony, we have been working hard in the development of our project to take into consideration the interests of every U.S. energy consumer, every U.S. taxpayer, the economic interests of Alaskan citizens and the State of Alaska, the interests of our Canadian neighbors, the interests of non-governmental organizations that are concerned with social and environmental issues, and even the interests of natural gas producers at Prudhoe Bay and in northern Canada. I realize that some of these interested parties may have some questions about our efforts, but I urge each of you to give the Northern Route the opportunity to succeed. It is the only route that is economically viable today and into the foreseeable future.

The reserves on Alaska's North Slope and in Canada's Mackenzie Valley are enormous and constitute the only major proven new supply of natural gas that can help meet the nation's growing demand for natural gas. There are currently proven reserves of 35 Tcf on Alaska's North Slope and 9 Tcf in the Mackenzie Delta region of Canada. That gas was found roughly 30 years ago when explorers were looking for oil. The exploration potential for each area is very large: 100 Tcf in Alaska and 90 Tcf in Canada.

The most economic pipeline system must be built to tap these proven and potential reserves. The lower the cost of the system, the greater the incentive to find and produce more natural gas. ARC's Northern Route proposal is today the only pipeline project that is economic. Delivering this proven natural gas resource to market is the most important single energy project that we know of to supply significantly larger volumes of the clean-burning fuel within the next 7 to 15 years. Without these new sources, the U.S. economy will most likely have to endure short supplies of natural gas and rely on coal, imported oil, and liquefied natural gas (LNG) to meet new demand. I have often likened the importance of this project, the first transportation system for Arctic natural gas, to the first railroad built to California for the U.S. or to the West Coast for the Canadians.

Two-Pipeline Option

In recent years, a significant effort has been made to convince Congress that the currently preferred route of the State of Alaska, the Alaska Natural Gas Transportation System (ANGTS), is the only route available to bring to market North Slope gas. That system would parallel the Alyeska oil pipeline right-of-way to Fairbanks then follow the Alaska Highway to northeastern British Columbia. That is not far enough to get to the main hub of existing gas pipelines for take-away capacity, so it will need to extend to interconnects near Edmonton, Alberta. The assertion that this is the only option available to develop these resources is simply not true.

Furthermore, one of the main problems of the ANGTS route is that a second pipeline will be needed to tie in the Canadian reserves in the Mackenzie Valley (See Table 1).^{*} This immediately creates conflict between the U.S. and Canada. Which line goes first? The first line can lower the value of the second line by delaying the need for the gas, possibly for decades. The Alaskans have always assumed that their line would go first, but approximately two-thirds of the ANGTS line goes through Canada. During last year's energy bill debate, the Canadian and Northwest Territories governments defended Canada's right and duty to protect its own energy interests. In numerous instances last year, Canadian government representatives intimated that final permitting for an ANGTS line would not be allowed while Canadian Mackenzie Valley reserves remained stranded.¹ This year, Canada has reiterated the need to develop Mackenzie Valley gas either before or in conjunction with permitting a line for North Slope gas.

The Northern Route

The best alternative available for development of these vital reserves is the single pipeline system solution, the so-called Northern Route, or as we refer to it, the Northern Gas Pipeline Project (NGPP). This one pipeline system enables both Prudhoe Bay gas and Canadian Arctic (NWT, Yukon and Nunavut) gas to be tapped. The line goes from Prudhoe Bay, offshore east into and beneath the Beau-

^{*}Tables 1-3 have been retained in committee files.

¹Canadian Energy Minister Herb Dhaliwal statement, *The Globe and Mail*, "Ottawa Girds for Trade War with U.S.," May 3, 2002.

fort Sea to the Mackenzie Delta, and then down the Mackenzie Valley to the pipeline interconnects near Edmonton, Alberta (See Table 2).

Our approach calls for a phased implementation of the project. In Phase 1 we would lay an initial 36-inch pipeline from Edmonton, Alberta north to the reserves in the Mackenzie Delta. In Phase 2 we would extend the initial 36-inch line over to the Prudhoe Bay unit, allowing staging of the volumes into the markets. That would be followed by Phase 3—a second 36-inch pipeline from Edmonton up the Mackenzie Valley. In Phase 4 we would lay a second 36-inch line over to the Prudhoe Bay unit, allowing for a full deliverable capacity of 5.2 Bcf/day. This would be an open-access line with spare capacity for the volumes from new exploration finds. This project has great cost, supply reliability and market advantages, since materials, equipment and construction services are available to construct 36-inch pipelines and many pipe mills, including mills in Canada and the U.S., can supply this size of pipe.

Economics

The economic and environmental impacts of the two-pipeline option versus the Northern Route are vastly different, as evidenced using released or third party numbers. The capital construction cost of the ANGTS route is estimated at \$11.6 billion, the line is 2,140 miles long from Prudhoe Bay to interconnects near Edmonton, and it crosses approximately 900 miles of pristine mountains. Furthermore, it does not go through the major future exploration potential areas. Current industry proposals suggest a pipeline 52 inches in diameter carrying 4.5 Bcf/day. The associated and necessary Mackenzie Valley only line would be an additional 1,350 miles long with an added cost of \$3 billion to get to pipeline interconnections near Edmonton. It would have a diameter of 30 inches with a design capacity of 1.2 Bcf/day. Together, the two pipeline projects would cost \$14.6 billion and would have a combined length of 3,500 miles, leaving two environmental footprints.

The Northern Route would be approximately 1,700 miles long—approximately 350 miles offshore and 1,350 miles onshore—and would not cross any mountains. Furthermore, it would go close to or through all present and future exploration areas in both Canada and Alaska. Approximately 90% of the line would be in Canada.

The most telling difference in the two approaches is how much of the eventual proceeds will be available to the producer. That is defined as the wellhead netback, proceeds after all transportation costs are deducted. One of the major producers has stated that they will not consider moving forward with development of any gas projects unless they provide an adequate (15%) rate of return with gas prices at \$2.50 per thousand cubic feet (Mcf).² Though gas prices have been uncharacteristically high in recent months, a project still needs to provide sufficient wellhead netbacks. At \$2.50/Mcf gas, the ANGSS route is clearly uneconomical, as is the Mackenzie only pipeline, with essentially no wellhead netback. (See attached Table 3 that compares the project costs.) It would take very large subsidies—perhaps \$5 to \$6 billion in direct funding—to make the two pipeline approach financially viable. There also remains the Canadian conflict situation and a higher chance of cost overruns. It has been estimated that if both an ANGTS and Mackenzie Valley only pipeline were to be constructed at the same time, construction costs would be 20% to 30% higher due to lack of construction resources, materials and equipment. The bottom line: economics do matter and they point overwhelmingly to the Northern Route.

Alaska's Situation

Alaska's preference of the ANGTS route is easily understood. If all things were equal, it is clearly more desirable to have the pipeline come through the state, provide gas to Fairbanks and other communities along the Alaska Highway, and possibly even to Anchorage some day, and to provide more short-term construction jobs in Alaska. The problem, though, is that all things are not equal. Alaska is pushing for a system that is uneconomical, will require two pipelines to be built, and creates conflict with Canada, where approximately two-thirds of their pipeline and additional takeaway capacity lines must be approved and constructed. I do not believe Canada will approve the ANGTS route, lower the value of Canadian reserves and require the construction of a second line to deliver the Mackenzie Valley gas to market.

Alaska should not trade short-term economics when it knows that at historical prices, the State will make about \$145 to \$201 million or more per year off of higher

²Senator Frank Murkowski and The Williams Companies Chairman Keith E. Bailey, *Senate Energy & Natural Resources Committee Hearing on an Alaska Natural Gas Pipeline*, October 2, 2001.

taxes and state royalties with the Northern Route.³ The Northern Route will enable the State to receive the maximum possible value for their existing and future reserves. That should be the overriding objective of the State of Alaska.

It is quite clear that the single pipeline system approach is the best on all counts. Last year, Alaska tried to use its Congressional seniority and political muscle to prohibit the Northern Route, but that could work against them in the end by causing delays in the development of any pipeline project and U.S. consumers and the citizens of Alaska will suffer as a result.

The Myths of the Northern Route

The major myths associated with the Northern Route fit in the following categories:

First Myth: Arctic offshore construction is unproven and risky environmentally.

There are currently offshore pipelines in similar environments, and more recently off Prudhoe Bay. No major construction companies or major oil companies have said it is not feasible. British Petroleum is already operating the Northstar oil pipeline in Prudhoe Bay in the Alaskan Arctic—a Northern Route gas pipeline would be similar. Canada already has regulations in place for pipelines of this nature. The present design calls for the pipeline to be buried approximately 15 feet below the ocean floor. Historical ice scour data for the proposed area of construction is in the 1 to 2 foot range. This will be a conditioned natural gas pipeline. If a leak or rupture ever occurred, the gas would vaporize into the air and would not leave a spill like an oil pipeline. It is important to note that with current metallurgical and pipeline test standards, it is unlikely that a pipeline carrying conditioned natural gas would suffer such a structural failure.

The real environmental problems lie with the two-pipeline approach. Two environmental footprints, scarring 3,400 miles, including 900 miles of mountains, would occur with this approach. With the single pipeline route approach, there would be one environmental footprint for a 1,700 mile pipeline, crossing no mountains. The major environmental concern should be the emissions consequences of delays in the development of a pipeline system to deliver the Arctic gas to markets from the resulting increase in the use of coal, oil and less efficient imported LNG. Federal price subsidies and the belief that Federal price subsidies may become available to incentivize an uneconomic pipeline will delay the development of any pipeline system and result in environmental degradation from growing the North American economy on less environmentally friendly fuels.

Second Myth: It will hurt whale migration.

Migratory Bowhead whales pass through this area twice each year. Present construction methodology has the offshore portion of the pipeline being laid during the winter and summer seasons. There is no whale migration during the winter.

When summer construction is carried out, it would be scheduled around whale migration and other wildlife or subsistence issues. The line would be buried below the ocean floor, with no surface structures to impede the movements of the whales or other mammals in the area. Once laid, the pipeline is out of sight and out of mind.

Third Myth: The pipeline is a step toward opening up ANWR for drilling.

This project has no bearing on the ANWR question. One is either in favor of or against the development of ANWR. This pipeline project is designed to connect existing Prudhoe Bay reserves and related future exploration areas where leases are available.

Fourth Myth: Existing regulatory and international agreements prohibit the Northern Route.

The Federal Energy Regulatory Commission (FERC) and the Department of Energy have testified that that is not true.⁴ In addition, in the event that the Alaska Coastal Commission uses its authority to declare the Northern Route inconsistent with the Alaska Coastal Zone Management Plan, there is an appeals process established in the Coastal Zone Management Act that can be employed to adjudicate that decision. Other statutes and regulations may also be employed in an effort to impede the development of a project. That is to be expected. Any project that is ultimately permitted to deliver Arctic natural gas to market will likely face regulatory

³ Alaska Economic Report & Alaska Legislative Digest Special Resource Supplement, *Gas—The Value Chain*, September 29, 2000.

⁴ FERC Chairman Patrick Wood III and DOE Acting Assistant Secretary for Fossil Energy Robert S. Kripowicz testimony, *Senate Energy & Natural Resources Committee Hearing on an Alaska Natural Gas Pipeline*, October 2, 2001.

and legal challenges. That is the nature of major energy project development in the 21st Century. Any prudent project planning process must take such challenges into account.

How To Do the Project

The real question is not which route. The real question, I believe, is what is the best way to get the project built? There are basically two approaches: the ARC approach or a project led by the major oil companies.

Twenty-five years ago, the same two routes were considered. Industry fought for 3 years and spent around \$750 million in this effort. The major oil companies wanted a northern onshore route similar to ARC's northern offshore route,⁵ but the Canadian Government placed a ten-year moratorium on pipelines in the Mackenzie Valley and blocked it due to unsettled Aboriginal land claims. I was Vice President of Natural Gas for Exxon at that time and in that effort learned a lot about how not to get projects done.

ARC at this time is the only company sponsoring the Northern Route. ArcticGas Resources Limited Partnership, the Canadian affiliate of ARC, on January 16, 2002, filed a Preliminary Information Package with the National Energy Board in Canada on behalf of the Northern Route Gas Pipeline Corporation (NRGPC). Our approach is twofold: create the most economical project, and eliminate as many roadblocks as possible. We know this approach is not conventional, and do not expect to get the immediate support of the major reserve holders. However, it is the best way to do the project. The 4 main features of our proposal are as follows:

1. The best route—best economics. This feature has been covered.
2. Significant Northern Canadian Aboriginal ownership. This is perhaps one of the most controversial parts, but we consider it very important. The Northern Canadian Aboriginals own part of the lands through settlement of their land claims with Canada and they are in a position to help the project considerably. We wanted to include them up front and in a meaningful and significant way. They have formed a 100% Aboriginal owned Pipeline Company, the NRGPC. This company would issue the debt for the pipeline. Arctic Resources Company (which is planned to be, ultimately, a consortium of the founders, the major reserve holders, the major gas customers, and the Aboriginal for profit groups, pipeline companies, NGO's and other interested parties), through its Canadian affiliate, ArcticGas Resources Corp., would be the program manager for NRGPC. ARC would oversee the project development, financing, engineering, construction, and ongoing operations; and would be in place to manage the repayment of the bond obligations.
3. Our financing concept is to use municipal type, taxable, non-recourse revenue bonds, with the revenue stream guaranteed by shippers' throughput agreements at a negotiated toll level agreed to by U.S. and Canadian regulatory authorities. This is very similar to many infrastructure projects in place today. Some examples are toll ways, stadiums and airports. This will be 100% debt financed and, by not having the more costly equity component, the project is able to pay the Aboriginal landowners sufficient land use fees and still keep the overall toll low. This approach is the best way to eliminate roadblocks and keep the lowest toll possible. It has the added benefit of creating a revenue stream for the Aboriginals that will end up helping their progress dramatically. The same type of approach can be used in Alaska as well.

4. The major oil companies have said on several occasions that this is a world-class project and a world-class company is needed to run it. Once they and others join the consortium, ARC will truly become a world-class company and a world-class international consortium. In the meantime, we are telling our story, gathering Aboriginal support, and working through the permitting process at the National Energy Board (NEB) in Canada. On January 24, 2003, the K'ahsho Got'ine, through their K'ahsho Got'ine Land Corporation, announced their intention to sign, subject to certain conditions, a Cooperation and Land Access Agreement for the Northern Gas Pipeline Project and to joining NRGPC. That agreement will provide for Aboriginal control of their own lands and environment through ownership of the Northern Gas Pipeline Project, while providing the lowest transportation costs to Alaskan and NWT shippers through the line.

Summary

There is only one clear choice for the best way to do this project—the most important energy project of this new century for North America. A political consensus between the U.S. and Canada, and eventually Alaska, can be achieved. It is truly an

⁵ Alaskan Arctic Gas Pipeline Co., Public Affairs Department, *Why the Arctic Gas Project is Best for All America*, June, 1977.

international project and we believe that joint discussions between the U.S. and Canada as to the best project, and the best way to get it approved, should be encouraged. The Northern Route provides U.S. consumers with the opportunity to benefit from the largest supply of natural gas from both Alaska and Canada. It can be the fastest project because it will not be shut in due to high tariffs as gas prices fall. Additionally, the U.S. will make at least \$5 to \$10 billion more on income taxes. Alaska will also benefit by \$100 million or more per year for the same reason.

This project is about the economic future of the U.S. and Canada. It is the best answer for delivering Alaskan and Canadian Arctic natural gas for U.S. and Canadian gas consumers and taxpayers. We ask that the U.S. Senate not take any actions that would artificially limit our options for delivering Alaskan and Canadian natural gas to market. Last year's adoption by the House and Senate of an amendment prohibiting a "certain pipeline route" from being permitted by the FERC in their respective energy bills was an affront to our neighbor Canada and, if ultimately enacted, a financial roadblock to the delivery of Arctic natural gas to U.S. markets.

We are only asking for a fair playing field, a provision to speed up the regulatory and review process and the equivalence of any economic support that might be offered to any other project. The U.S., Canada and Alaska will all benefit from the most economic project that will provide for the greatest exploration incentive for new reserves.

MORGAN MEGUIRE LLC,
Washington, DC, February 25, 2003.

SHANE PERKINS,
Staff Assistant, Senate Energy and Natural Resources Committee, Dirksen Senate
Office Building, Washington, DC.

SHANE: Enclosed, please find hard copies of and a CD containing testimony for today's hearing on Natural Gas Supply and Prices submitted by Dan Lopez, President of New Mexico Tech. We attempted to e-mail you the documents yesterday, but the attached presentations to the letter were too large to e-mail.

Please contact me or Kyle Simpson at 202-661-6180 if you have any questions or concerns.

Best regards,

JACK N. JACOBSON,
Associate.

[Note: The Technology Roadmap for Unconventional Gas Resources and Future Natural Gas Supplies and the Ultra-Deepwater Gulf of Mexico have been retained in committee files.]

NEW MEXICO TECH,
OFFICE OF THE PRESIDENT,
Socorro, NM, February 24, 2003.

Hon. PETE V. DOMENICI,
Chairman, Senate Energy and Natural Resources Committee, Dirksen Senate Office
Building, Washington, DC.

DEAR MR. CHAIRMAN: I am writing to encourage you to make certain that any energy bill that is reported from the Senate Energy and Natural Resources Committee and passed in this Congress authorizes the *Energy Research, Development, Demonstration, and Commercial Application Act of 2003*. In the House, authorization for this new program is contained in H.R. 238, the *Energy Research, Development, Demonstration, and Commercial Application Act of 2003*. The bill was introduced on January 8, 2003, by Representatives Sherwood Boehlert (R-NY) and Ralph Hall (D-TX). The language is the compromise language that was worked out by the staff of the conference committee on the energy legislation in the 107th Congress. Your Committee is holding a hearing on gas supply and prices on Tuesday, February 25, 2003. I respectfully request that you include this letter and the two attachments in the record of the hearing.

If authorized, the measure would establish new programs of research, development, demonstration, and commercial (R,D,D&C) application of technologies for ultra-deepwater and unconventional onshore natural gas and other petroleum resource exploration and production, including safe operations and environmental mitigation. These programs constitute a new method for managing joint industry and government funded R,D,D&C activities to more closely match Federal resources

to industry investment practices and technology needs. Most of the research will be managed and conducted by consortia of industry, academia, other research institutions and National Laboratories. The benefit will be increased gas and oil production in the near term as a result of the timely development and demonstration of new technologies that will lower the cost of production by 30 to 50 percent from domestic ultra-deepwater and unconventional onshore reserves.

The legislation authorizes the Department of Energy, in partnership with industry, to develop technologies to produce natural gas and oil reserves in the ultra-deepwater of the Central and Western Gulf of Mexico, with a focus on improving, while lowering costs and reducing environmental impacts, the safety and efficiency of the recovery of ultra-deepwater resources and sub-sea production technology used for such recovery. The program is also will advance the science and technology available to domestic onshore unconventional natural gas and oil producers, particularly independent producers, through advances in technology for production of unconventional resources. These new programs are designed to help the nation meet its growing energy supply needs over the next two decades.

According to the Energy Information Administration (EIA), "Domestic natural gas production is expected to increase more slowly than consumption." In the *Annual Energy Outlook 2003* (AEO 2003), EIA has reduced its projections of domestic production by 3.4 Tcf to 25.1 Tcf per year in 2020, in part due to "reduced expectations for technological improvement for unconventional gas." In 2025, domestic production is expected to reach only 26.8 Tcf and 2.6 Tcf of that amount will be in Alaska. Consumption is expected to increase from 22.6 Tcf in 2001 to between 31.8 Tcf and 37.5 Tcf in 2025. EIA projects the difference between production and consumption will be met with imports, including 2.1 Tcf in the form of LNG, unless production technology for the lower-48 unconventional and ultra-deepwater offshore is dramatically improved.

Technology improvements can make a difference. In the AEO 2000, EIA projected that "a higher rate of technological progress is expected to result in a higher projection for domestic natural gas production." That is consistent with the National Petroleum Council (NPC) recommendations for meeting natural gas demand in their 1999 natural gas study. In that study, the NPC recommended that, "The government should continue investing in research and development through collaborations with industry, state organizations, national laboratories and universities." Enacting the *Ultra-deepwater and Unconventional Natural Gas and Other Petroleum Resources Program* would be responsive to the NPC recommendation.

The new ultra-deepwater and unconventional energy R&D programs included in the measure would help to meet our growing demand for natural gas by establishing industry-led programs to develop reserves in the ultra-deepwater of the Central and Western Gulf of Mexico and unconventional onshore reserves in deep formations and other gas resources such as tight sands, gas shales and coal bed methane. The legislation would also authorize additional funding for DOE's long-term, cross-cutting, enabling energy supply R&D to support this program.

Natural gas and other petroleum in the ultra-deepwater and unconventional onshore reserves can provide a significant portion of the incremental supply of energy needed to meet growing demand over the next 20 years if the economic and technical impediments to development are minimized. Modeling shows that, over the next 15 years, with advanced technology developed to increase production from the ultra-deepwater and unconventional onshore resources, we could economically add productive capacity of at least 6.7 Tcf of natural gas per year. To offer another perspective on the extent of this resource, the deepwater and ultra-deepwater Gulf of Mexico and the unconventional onshore are the largest opportunities remaining in the United States in areas that are currently available to be developed.

There is a clear and significant public purpose for the development of domestic resources. The costs and risks associated with this development are sufficiently high that without a strong and focused public/private partnership these resources will not be economically producible to meet our mid-term energy needs. If we are to develop these domestic resources to meet the nation's energy requirements over the next ten to twenty years, it is critical that we provide federal R&D investment through public/private partnerships to lower the cost, increase the safety and mitigate the environmental impact of producing from these areas.

These new natural gas R&D programs have the support of a diverse coalition ranging from large industrial end-use consumers, to research organizations and academia, to key industry players both large and small. It also has bipartisan support in Congress. I believe these programs are a critical component of our nation's future

energy security. I urge you to include them in an energy bill that is passed by the Senate and ultimately enacted into law.

Sincerely,

DANIEL H. LÓPEZ,
President.

ENERSEA TRANSPORT, LLC,
Houston, TX, February 25, 2003.

Hon. PETE DOMENICI,
*U.S. Senate, Energy and Natural Resources Committee, Dirksen Senate Building,
Washington, DC.*

DEAR CHAIRMAN DOMENICI: It is my understanding that you will be holding a hearing on the important issue of natural gas supply and prices on February 25, 2003. On behalf of EnerSea Transport, a Houston based compressed natural gas (CNG) transportation and storage company, I would like to request the attached written testimony be submitted for the record. I believe it will help to expand the discussion of how CNG is a viable option for transporting and delivering natural gas to the marketplace.

Thank you for your consideration on this matter and I look forward to working with you to find solutions to meet increasing natural gas demand in the U.S.

Regards,

PAUL BRITTON,
Managing Director.

STATEMENT OF PAUL BRITTON, MANAGING DIRECTOR, ENERSEA TRANSPORT, LLC

On behalf of EnerSea Transport, a Houston-based compressed natural gas (CNG) transportation and storage company, I would like to submit the following written comments for the record. My comments will be focused on how marine transportation of CNG can make a significant contribution to the effort to meet future natural gas demand in the U.S. and around the world.

At EnerSea, we are commercializing a breakthrough, cost effective CNG marine transport and storage system. We have been able to develop a total delivery solution for transporting remote and heretofore stranded gas supplies to the marketplace. Specifically, the volume optimized transport and storage CNG system known as VOTRANS™ can best be described as a sea-going pipeline, comprised of long, large-diameter pipes contained within an insulated structure, integrated into a ship. We have improved upon previous COG concepts by combining optimal storage efficiency, the ability to transport both lean and rich gas, an innovative off-loading process to offshore ports, and significantly lower compression requirements. The result is increased vessel capacities and reduced overall costs.

Our recently patented CNG technology has the ability to transport as much as 2 billion cubic feet of gas per ship to markets up to 4,000 miles away at substantially lower cost than other gas transportation alternatives. The system provides unprecedented flexibility and risk management capabilities to accommodate expanding production volumes and developing markets—a value to consumers, producers and nations worldwide.

To help meet increasing natural gas demand in the U.S., we are working to apply our CNG technology to stranded natural gas reserves in North and South America—specifically in places such as East Coast Canada, ultra-deepwater Gulf of Mexico, Alaska, Venezuela, Colombia and the Caribbean. Today, up to 80% of the natural gas fields worldwide are stranded and have yet to be developed—potentially a tremendous resource.

As you are aware, these large gas reserves have been stranded because they are uneconomic to pursue due to geographic or geopolitical constraints. Through technological innovation, VOTRANS™ will reduce the need for field processing facilities. The scalability of the VOTRANS™ technology also allows for phased development opportunities to match fields with market demand centers. This provides the ability to pursue smaller and more remote gas reserves. In addition, fields can typically be brought on stream earlier compared to more capital intensive alternatives.

I want to briefly highlight several activities that EnerSea has undertaken to date. EnerSea Canada was established to bring forward the development of Atlantic Canada offshore gas, specifically in the Grand Banks Region off the coast of Newfoundland to supply Northeast U.S. markets. We are establishing the world's first CNG Center of Excellence to promote and coordinate the participation of government,

academia, the exploration and production industry and offshore service companies in the advancement of this emerging CNG industry for worldwide applications.

In continuing our efforts to employ our innovative CNG technology and execute world-scale projects, we created partnerships in June and July of this year with Hyundai Heavy Industries, the world's largest shipbuilder and "K" Line, a leading LNG ship owner and operator. Both entities are working with us during our current Maritime Work Program to commercialize the technology and provide highly qualified gas ship operations experience. EnerSea is also working with American Bureau of Shipping to achieve Class Approval in Principle of its designs in early 2003. EnerSea has had numerous discussions with the U.S. Coast Guard over the last 18 months and plans to submit its engineering package for USCG "Concept Review" in Summer 2003.

In addition, we have been working with all the major producers to educate them on the benefits of CNG and specifically the application of EnerSea's CNG technology. Given these advances, we strongly believe that CNG is a viable option in the portfolio of technologies that will be needed to meet increasing natural gas demand. And, we are not alone in this belief. Congress recently passed, and President Bush signed into law the *Maritime Transportation Security Act of 2002* that expanded the Deepwater Ports Act to create a regulatory framework for permitting the safe and secure transport and delivery of natural gas in a compressed or liquefied form to offshore terminals in the United States. Given this, our plan is to have completed transportation agreements in 2003 with gas delivery services to follow within 30-36 months.

Our nation's growing appetite for natural gas is a great opportunity as well as a challenge. All options must be considered for meeting that demand. EnerSea's CNG technology is a safe, viable and cost-effective option. When shaping the regulatory framework for the future, I encourage policymakers, industry planners and decision makers to be certain to include the application of CNG technologies for delivering currently stranded natural gas to market.

Thank you for this opportunity to inform the Committee of the advances that our company is making and the promise of CNG transport for meeting our Nation's growing demand for natural gas.

AMERICAN PETROLEUM INSTITUTE,
Washington, DC, March 10, 2003.

Hon. PETE V. DOMENICI,
U.S. Senate, Washington, DC.

DEAR SENATOR DOMENICI: On February 25, 2003, the Senate Energy and Natural Resources Committee conducted a hearing on Natural Gas Supply and Prices. The American Petroleum Institute (API) is pleased to submit this letter and its attachment for the hearing's written record. API represents all sectors of the U.S. oil and natural gas industry, including those who explore for and produce oil and natural gas.

Natural gas provides more than one-fifth of the nation's energy. It heats and cools millions of homes, fires a significant number of electric power plants, and is an essential feedstock for myriad industrial and agricultural products. The U.S. Energy Information Administration projects national consumption of natural gas will grow by 50 percent by 2025 and will provide a greater percentage of the nation's energy in the years ahead. It is expected that more than 80 percent of new electric power generating capacity will use natural gas if sufficient supplies are available.

Tighter inventories and higher prices for natural gas have raised questions about the adequacy of natural gas supplies—both now and in the future. The current market reflects this winter's colder weather in the Midwest, Mid-Atlantic and Northeast, which has increased demand for natural gas and reduced inventories. It also reflects the legacy of previous energy policy decisions that have discouraged or blocked exploration and production of domestic supplies of natural gas. Over the near term, higher prices may encourage some additional drilling and increase in supplies. However, there are significant obstacles to a future of ample and affordable supplies. Some of these include access and development restrictions, infrastructure constraints, high investment costs, and dwindling production from traditional sources.

To change the future to one where our domestic energy resource potential is fully realized, it is imperative that comprehensive energy legislation be enacted.

Looking specifically at natural gas prices, drilling and production and the challenges to increasing production in the years ahead, the following factors must be considered as energy legislation is shaped:

- *Drilling has increased in recent years, but production has declined*

U.S. natural gas production in the fourth quarter of 2002 was down about four percent from the fourth quarter of 2001. Indeed, U.S. natural gas production today is lower than it was five years ago, despite increases in drilling in recent years. In 2001, the industry drilled about 22,000 natural gas wells, nearly double the number of wells drilled in each of the four previous years. Drilling activity declined by 30 percent in 2002.

- *Historically, rig counts and new production have lagged behind price rises*

Higher prices do not necessarily lead to immediate increases in rig counts and new production. Additional production can take months or longer depending on factors such as government permitting, availability of drilling equipment, labor availability, time to drill the well, infrastructure to connect to natural gas pipelines, and the weather at the production site.

- *Traditional sources/fields are in decline*

Since 1970, the United States has seen a progressive decline in the ability to satisfy the growth in natural gas demand from traditional sources—most of which are on private or state lands in the lower 48 states. While the U.S. is a “mature” area, untapped fields remain. However, finding them and producing this gas is becoming more and more expensive. Canadian production also seems to be declining.

Offshore production has declined in the shallow waters of the Gulf of Mexico. However, technology advances have allowed greater activity in deeper waters. Deepwater gas supplies offset most of the decline in shallow waters, thus stabilizing OCS gas supply. In addition to long lead times, deepwater fields tend to have shorter lives than onshore wells.

Less mature areas such as the deep waters of the Gulf of Mexico and the eastern coast of Canada will help, but developing such areas can take years. In addition, the same technology that is helping us reach more areas is making it possible to deplete the gas found at a much faster rate, so that a typical well drilled today will decline at a faster rate than a well drilled 10 years ago.

- *The denial or restriction of access and barriers to development have made the industry “prospect poor”*

Nearly 40 percent of the potential domestic natural gas resource base on federal land is either off limits or only open to development under highly restricted conditions. Offshore, federal moratoria prohibit the exploration and development of some of the nation’s most promising resources. Federal policies in the Rocky Mountains have also placed substantial resources off limits. Studies by the National Petroleum Council and the Interior Department have concluded that nearly 40 percent of the gas resource base in the Rockies is restricted from development either partially or totally.

The recent Energy Policy and Conservation Act (EPCA) inventory of onshore federal lands concentrated on land available for leasing. It did not adequately examine the significant impediments to development on lands already leased. Obtaining all the permits to begin a well after a lease has been obtained can take months or years, making the process extremely expensive and, in some cases, prohibitive.

According to the Independent Petroleum Association of Mountain States, Applications for Permit to Drill (APD) that are supposed to take 30 days to process, took an average 137 days to be approved in 2002—at least one took 370 days. From 2001 to 2002, the average time it took to obtain approval of a drilling permit increased 60 percent.

The high cost of obtaining permits has made some projects marginally economic and has prevented some smaller companies from operating on some public lands.

Opponents of drilling contribute to delay by exploiting conflicts in federal policies. For example, the Coastal Zone Management Act has been invoked by states to block natural gas pipeline projects as well as to block offshore leasing and development.

Without production from areas currently under access and development restrictions, it is unlikely producers can significantly increase gas from the lower 48 states.

- *Substantial E&P capital investment decisions, especially in frontier areas, are not based on short-term prices*

To meet future natural gas demand, producers must invest many billions of dollars annually. To get these funds, the industry must compete against other domestic investment options that produce higher returns as well as competing against potentially lower cost foreign investments. Exploration and production planning can be risky because market volatility, as has recently been experienced, can deny producers reasonable assurance that their investments will be rewarded. For example, over

the past two years prices have ranged from about \$2 per million cubic feet of natural gas to \$10 per million cubic feet. Prudent planning demands that producers average out prices over the long term to determine investments.

- *There are serious infrastructure constraints*

Even with greater access, there may be significant challenges to delivering new gas. In the Rockies, there is concern about adequate pipeline capacity. Similarly, to tap the huge natural gas reserves in Alaska, a new pipeline is needed. Permitting challenges are formidable in Alaska and the lower 48 states. Recent uncertainty in the energy markets and questions about future regulatory policy may also discourage new pipeline construction.

In summary, we appreciate the committee's interest in natural gas supplies and how our domestic energy resources can be developed to enhance economic growth while continuing to protect the environment. Natural gas is a clean-burning fuel and is essential to industrial, agricultural and residential consumers. Enclosed is a paper, *Natural gas: will the promise be realized?** that further delineates the challenges ahead. Enacting comprehensive energy policy legislation that encourages the development of our domestic energy resources is imperative so that consumers can continue to enjoy reliable and affordable energy supplies. Again, API appreciates this opportunity to provide comments for the record. We would be pleased to answer any additional questions you may have.

Sincerely,

CHARLES E. SANDLER,
Vice President.

STATEMENT OF THE NATIONAL PETROCHEMICAL & REFINERS ASSOCIATION

The National Petrochemical & Refiners Association (NPRA) is a trade association representing virtually all of the U.S. refining industry and petrochemical producers that use processes similar to those by the refining industry. NPRA appreciates the interest of the Senate Committee on Energy & Natural Resources in developing a national energy plan that includes traditional supply and market-oriented policies for fossil fuels, including natural gas.

NPRA believes that as part of the debate on national energy policy, it is essential that lawmakers recognize that natural gas is used as both a fuel and a feedstock to U.S. petrochemical producers and that its cost must be reasonable and its supply adequate and predictable in order to maintain a competitive U.S. petrochemical industry in a worldwide marketplace. Environmental requirements are creating increasing pressure for industrial facilities to convert to natural gas use. The impact of these environmental policies on natural gas demand has not been assessed, and must be part of the energy debate. NPRA believes that diverse, robust, and affordable supplies of all fossil fuels are essential for maintaining national security, economic growth, and the viability of the U.S. refining and petrochemical industries.

NATURAL GAS IS AN INDUSTRIAL FEEDSTOCK AND FUEL

Natural gas and natural gas liquids extracted from natural gas are important raw materials or feedstocks used in the manufacture of petrochemicals. About 70% of U.S. petrochemical manufacturers use natural gas liquids as feedstocks. In contrast, about 70% of petrochemical producers in Western Europe and Asia use naphtha (a heavy oil) as a feedstock. While oil is a global commodity whose price is set on the global market, natural gas liquids are more locally-traded commodities, so price increases in natural gas have had more impact on competitiveness in North American-produced petrochemicals. For many years, the U.S. has enjoyed a low-cost feedstock position relative to competitors in Europe and Asia. However, that advantage has been lost as the price of natural gas has soared. Also, domestic petrochemical manufacturers rely on large quantities of natural gas in their production processes, to fuel combined heat and power units, and to achieve energy efficiency.

PRODUCTS OF THE PETROCHEMICAL INDUSTRY

The petrochemical industry supplies consumers with a wide variety of products that are used daily in homes and businesses. The industry manufactures chemicals that serve as "building blocks" in making everything from plastics to clothing to medicine to computers. They also contribute essential materials for making food and

*The paper entitled "*Natural Gas: Will the Promise Be Realized?*" has been retained in committee files.

beverage containers, surgical gloves and gowns, fertilizer, blankets, cold weather and rain gear, sneakers, computers, insulation, cameras, medicines, artificial joints, auto and aircraft parts, disposable diapers, CDs, and many more key consumer products. Therefore, the costs of natural gas and natural gas liquids to petrochemical manufacturers affect the cost and availability of these essential consumer products.

RECENT HISTORY OF UNPRECEDENTED PRICE INCREASES—
U.S. AT A COMPETITIVE DISADVANTAGE

In 2000-2001, North American natural gas and natural gas liquids prices have risen to unprecedented levels and placed a significant portion of the domestic petrochemical industry at a disadvantage to European and Asian producers who use crude and its derivatives as feedstocks.

Two years of extraordinarily high natural gas prices has resulted in a negative trade balance for the U.S. economy. This negative trade balance is permitting foreign businesses to capture U.S. market share because European and Asian producers are not experiencing increased feedstock prices.

Another example of the competitive imbalance is the shortage and cost of ethane and ethylene. Ethane is the principal hydrocarbon raw material for organic chemistry in the United States. Currently, only 50% of the ethane available is actually extracted from the raw gas stream. NPRA believes it is also important for the Congress to ensure there is enough ethane available to preserve the global competitiveness of this important U.S. industry.

PUBLIC DEBATE ON THE FUTURE OF NATURAL GAS SUPPLIES

There is serious public debate on the future of natural gas and natural gas supplies. Natural gas demand is projected to increase by 60% by the year 2020. Based on this forecast, Congress must act on policies which will create additional natural gas supply sources on public lands. Environmental policies that promote multi-pollutant approaches to emission reductions and tax incentives for alternative-fueled vehicles will drive up the demand for gas and have significant impacts on natural gas supply and price. The impact on natural gas supply of such policies and programs that result in fuel switching should be factored in when making any relevant policy decisions. If the Congress should decide to press forward with increased use of natural gas, it must be mindful of what increased demand will do to the costs and competitiveness of businesses that use this fuel as a feedstock.

If policies regarding natural gas are to be modified, they must include increased access and development opportunities to onshore public lands as well as those on the Outer Continental Shelf. New and promising domestic areas for development must be open for exploration and production. In the meantime, NPRA would urge caution as Congress and the Administration consider policies that will accelerate the demand for natural gas, unless they are accompanied by efforts to increase its supply.

SENATE-PASSED ENERGY LEGISLATION—107TH CONGRESS

During the second session of the 107th Congress, the Senate passed energy legislation that could have negatively impacted U.S. petrochemical producers who use natural gas as a fuel and feedstock. These provisions were not adequately debated and could have resulted in short-sighted energy policy if allowed to prevail.

Ethanol Mandate—NPRA is on record in strong opposition to the Senate-passed ethanol mandate which would require that gasoline contain 5 billion gallons of ethanol by 2012. In addition to our policy of opposing bans and mandates, NPRA believes that the ethanol provision could have significantly impacted petrochemical producers who use natural gas as a fuel and feedstock. The ethanol mandate was intended to spur uneconomic production and consumption of ethanol, which means that additional plants would be built in excess of what we would see under current law.

These new ethanol production plants may very well be natural-gas fired, which would increase competition for natural gas and in all probability, this would result in increased feedstock costs. These increased costs would put additional competitive pressure on the domestic petrochemical industry which is already feeling the effects of rising international competition.

Combined Heat & Power—Combined heat & power (CHP) facilities use natural gas to create electric power and steam with the same, constant amount of fuel. These power generation facilities are usually located physically closer to the power sources and are usually more efficient because they avoid transmission losses associ-

ated with the consumption of power generated many miles away by large electric utilities. Thus, CHP facilities enhance energy efficient projects.

Last year's energy bill included a provision that would have eliminated requirements that utilities purchase or sell electricity to qualifying cogeneration facilities under the Public Utility Regulatory Policies Act (PURPA). PURPA has been important in allowing CHP units that serve as industrial and commercial facilities to compete in an otherwise monopoly market. NPRA supported an amendment by Senators Tom Carper (D-Delaware) and Susan Collins (R-Maine) that would have continued current law, and required utilities to purchase electricity from cogeneration facilities that did not have access to competitive wholesale markets. If electricity deregulation is included in the energy bill for the 108th Congress, the Senate must act to preserve the critical energy supplies provided by CHP.

CONCLUSION

Natural gas and natural gas liquids provide the primary feedstocks in domestic petrochemical plants. Their availability at a reasonable cost is essential to keep the U.S. petrochemical industry competitive in a worldwide marketplace. We hope that the Congress will recognize that increased demands on natural gas supplies result in even tighter supplies and the cost of gas as a feedstock will continue to rise. While the principal focus of the natural gas debate will be on development of resources on public lands, policy makers should recognize that since natural gas is used as both a fuel and an industrial feedstock that there could be negative impacts to our businesses if natural gas demand increases but supplies remain tight. One thing is certainly clear; we need a thorough review and analysis of natural gas-related policies and gas supply and demand to maintain a vibrant U.S. petrochemical industry and U.S. economy.

STATEMENT OF THE AMERICAN CHEMISTRY COUNCIL

The American Chemistry Council (ACC) submits the following statement regarding natural gas supply and prices.

ACC represents the U.S.'s leading companies engaged in the business of chemistry. ACC members apply the science of chemistry to produce innovative products and services that make people's lives better, healthier and safer. ACC is committed to improved environmental, health and safety performance through Responsible Care®, common sense advocacy designed to address major public policy issues, and health and environmental research and product testing. The \$460 billion business of chemistry is a key element of the nation's economy. It is the country's largest exporter, accounting for ten cents out of every dollar in U.S. exports. Chemistry companies invest more in research and development than any other business sector. Safety and security have always been primary concerns of ACC members, and they have intensified their efforts, working closely with government agencies to improve security and to defend against any threat to the nation's critical infrastructure.

SUMMARY OF TESTIMONY

The U.S. chemistry business is highly dependent on natural gas, both as a source of fuel and as a raw material for many of its products. Our industry is a significant component of the U.S. economy. However, despite our advances in energy efficiency, this contribution requires enormous quantities of reasonably priced natural gas. Current high natural gas prices, caused primarily by constrained supplies and increased demand, are having a devastating impact on our industry. Federal government policies that contribute to constrained domestic natural gas production and caused utilities and other industries to switch from other fuels to natural gas contribute to our industry's situation. If the U.S. chemistry business is to remain competitive in today's global market and continue to contribute revenue, jobs, research and other benefits to the U.S. economy, natural gas prices must come down. Appropriate federal policies are needed to ensure a better balance between the supply of and demand for natural gas, and to keep prices at a reasonable level.

THE BUSINESS OF CHEMISTRY IS HIGHLY DEPENDENT ON NATURAL GAS

The current price of natural gas is the chemical industry's number one economic issue. Natural gas is the lifeblood of the chemistry business in the U.S. Not only do we use natural gas as a fuel in our manufacturing processes, much like other industries, but we also use it as an ingredient, or feedstock, for many of the products we make.

Natural gas and natural gas liquids contain hydrocarbon molecules that are split apart during processing and then recombined into useful chemical products. These products include life-saving medicines, health improvement products, technology-enhanced agricultural products, more protective packaging materials, synthetic fibers and permanent press-clothing, longer-lasting paints, stronger adhesives, faster microprocessors, more durable and safer tires, lightweight automobile parts, and stronger composite materials for aircraft and spacecraft. The business of chemistry also makes many of the products that help save energy throughout the entire economy, including insulation, house wraps, lubricants, and high-strength light-weight materials, enabling American industries and consumers to be more energy efficient. The business of chemistry is the only part of the economy that adds value to these hydrocarbon molecules rather than combusting them for energy.

Natural gas accounts for nearly thirty-nine percent of all energy consumption by the business of chemistry. Natural gas liquids that are derived from natural gas or refinery operations account for another twenty-three percent. In total, more than half of the U.S. business of chemistry's energy needs come from natural gas.

On average, more than \$1 of every \$10 the industry spends on materials is for natural gas. For some petrochemical producers, natural gas represents nearly one-quarter of the cost of materials. And nitrogenous fertilizer producers spend \$9 of every \$10 for natural gas.

The U.S. business of chemistry has invested billions of dollars in facilities that make chemical products from natural gas and natural gas components. These facilities do not have the ability to switch to other inputs and produce these products. This infrastructure was built based on the competitive advantage the U.S. offered through its natural gas supply.

While the U.S. chemistry business is the nation's single largest manufacturing consumer of natural gas, we are extremely energy efficient in the use of that gas. Through the use of combined heat and power ("CHP") generation, our facilities create two forms of energy—electric energy and thermal energy or steam, and both are put to work. The efficiency rating of many of our CHP facilities is often twice that of traditional electric generators. This efficiency level is further enhanced because the generation is physically located close to where it is used, avoiding transmission line losses. Use of CHP technologies by the business of chemistry accounts for nearly a third of all CHP used in manufacturing. And through the use of CHP technology, the business of chemistry has reduced its total fuel and power energy consumption per unit of output by more than fortythree percent since 1974. Nonetheless, our industry's natural gas fuel needs remain substantial.

Because of our industry's dual use of natural gas, as well as our significant presence in the U.S., the business of chemistry today accounts for eleven percent of domestic natural gas consumption, second only to electric utilities. As a result, changes in the natural gas market, such as constricted supply and inflated prices, have a particularly severe impact. In order for the domestic business of chemistry to remain competitive in the global marketplace and to be able to continue to provide employment and other benefits here at home, it is essential that measures be taken to increase natural gas supplies and to make these supplies available at reasonable prices.

NATURAL GAS DEMAND IS INCREASING, SUPPLY IS SHORT, AND PRICES ARE HIGH

The recent history of natural gas prices is a study in commodity price volatility. On January 4, 2000, the average spot price of natural gas at the Henry Hub was \$2.15/mmBtu. On January 5, 2001, the price had spiked up to \$9.82/mmBtu. On January 4, 2002, the price was \$2.36/mmBtu and on January 3, 2003, the average spot price at the Henry Hub was \$5.13/mmBtu. While this extreme volatility is indicative of a very tight supply situation in general, the more worrisome aspect of the experience of the last three years is what it foretells for the long-term. Historically, when gas prices began an upward climb, producers responded to the higher prices by drilling more wells, which produced additional supply and consequently lowered the price.

Our experiences over the past few years have not followed this history. Although gas producers responded to the extraordinary high prices of 2001 by greatly increasing the number of wells drilled, this activity did not lead to a commensurate increase in supply. The supply of natural gas actually increased only marginally during 2001 despite record high levels of drilling rigs operating. The price decline from January 2001 to January 2002 was a result of what economists call "demand destruction," brought about by a mild spring and summer and, ominously, the closing

or curtailment of manufacturing facilities. In other words prices dropped not because supply increased, but because demand decreased.

The reaction of producers during this most recent price run-up is much more cautious. Fewer new rigs are going into the fields and gas production has not responded to higher prices. This "Catch-22" response of producers not placing new rigs in service because they are fearful that prices will drop before they can recoup their costs only serves to keep the price high.

A disturbing reality of the U.S. natural gas market is that nearly 70% of it is price insensitive. This means that 70% of gas consumers have no option to either stop using energy or to use a different form of energy and must pay whatever the price is for the gas they need. The remaining 30% of demand, predominantly industrial manufacturers, can adjust to gas price swings by switching to more reasonably priced fuels or by ceasing to operate their manufacturing facilities. It is in this 30% that demand destruction occurs. In the past, this demand destruction generally has been temporary. Higher prices led to increased production and lesser demand, thereby increasing supply and moderating prices. Once prices returned to more economic levels, industrial consumers switched back to natural gas or restarted idled facilities.

In light of recent trends—record numbers of working drill rigs in 2001 did not increase supply; more stringent air quality regulations that limit or eliminate the ability to fuel switch; ever increasing demand for natural gas from price insensitive users—there is a significant risk that this historical pattern will not repeat itself. Rather, ACC is concerned that temporary demand destruction may become permanent demand destruction for many of its members.

THE IMPACT OF HIGH GAS PRICES

Restricted supplies and high prices for natural gas severely limit the ability of U.S. chemical manufacturers to remain competitive with foreign competitors. The business of chemistry in the U.S. is concentrated in the Gulf Coast region largely because of the region's proximity to a traditionally abundant, low cost supply of natural gas resources. While about seventy percent of U.S. petrochemicals production uses natural gas as a feedstock, the same percentage of producers in Western Europe and Asia use naphtha, a crude oil derivative. Unlike crude oil, the price of which is set by the global market, natural gas is not as broadly traded, with the result that price increases for natural gas in North America are felt only in North America. For many years, the U.S. business of chemistry enjoyed the benefit of relatively low cost feedstocks relative to our foreign competitors, enabling the industry to become the global leader in chemical products. A tightened natural gas market and soaring natural gas prices, however, put this position in jeopardy. For the business of chemistry, experience shows that, although this number fluctuates depending on the price of crude oil, the price for natural gas at which we become unable to compete in global markets is between \$3.25 and \$4.00. Current prices are hovering around \$6.00.

High natural gas prices significantly cut into our industry's profitability. For every one-dollar increase in the price of natural gas, over the course of a year, our industry incurs approximately \$1 billion in additional costs. Yet, because we compete in a global market, U.S. companies are unable to pass these added costs for natural gas along to their customers if our products are to remain competitively priced with those produced by our foreign competitors. In 1999, when the price of natural gas averaged \$2.27, the operating margin for basic chemical companies was 6.8%. In 2001, when the price of natural gas rose to an average of \$4.27, the operating margin dropped to 0.6%.

High natural gas prices also negatively impact productivity and employment in our industry. In any industry, a company faced with declining profitability must evaluate whether or not to continue operations. During the 2000-2001 "spike" in natural gas prices, many companies idled their operations. About fifty percent of the industry's methanol capacity and fifteen percent of the industry's ethylene capacity were simply shut down during this time. Many workers were sent home. As natural gas prices came down plants reopened. These relatively short-term increases in natural gas prices led to relatively short-term shutdowns. However, there are serious questions regarding how these companies will respond over the long-term if faced with a business environment with sustained conditions of tightened natural gas supply and high natural gas prices. For our employees, demand destruction sooner or later becomes job destruction.

As the second largest consumer of natural gas in the United States, trailing only electric utilities, the business of chemistry has been severely affected by these steep increases in natural gas prices. Prior to the run-up in gas prices in 2000 and 2001,

the business of chemistry, America's largest export industry, contributed one of the nation's highest positive trade balances. Today, after two years of high gas prices, our industry is facing a negative trade balance for the first time ever. High U.S. manufacturing costs, tied to inflated natural gas prices, allow foreign competitors, who do not face the same elevated energy and feedstock prices, to become low cost producers and capture market share at our expense. This has resulted in thousands of jobs lost and plants shut down, and the movement of investment capital overseas.

Here are some specific examples of the dramatic effect that the 2001 spike in natural gas prices had on companies in the business of chemistry:

- Almost one-half of the nation's methanol capacity and one-third of its ammonia capacity were shut down. Five years ago, the U.S. was relatively self-sufficient for its methanol needs. Now, we import about the same amount of methanol as we do crude oil.
- One company moved more than 750,000 pounds of ethylene production from Louisiana to Germany solely because of high natural gas prices. Much of this is then sold into U.S. markets, enhancing Germany's trade balance and further harming the U.S. balance of trade.
- Ethylene capacity dropped between ten and fifteen percent, with at least five percent of this drop due to plant shutdowns. Net trade in ethylene was at one-fifth of the 1997 level in 2001.
- The Gulf Coast region's economy, where most of the U.S. petrochemical industry is located, was hit particularly hard with widespread job losses due to plant shutdowns. In Louisiana alone, for example, over 2,000 jobs have been lost over the last four years just in the ammonia industry.
- The combined effect of higher natural gas prices led to fewer U.S. exports, greater U.S. imports, and a rising U.S. trade deficit. As a result, the U.S.'s export levels in 2001 fell at least \$13.5 billion, \$4.5 billion of which was attributable to the business of chemistry.
- Historically, ethylene production based on U.S. ethane (from natural gas) has had the lowest cost per pound after the Middle East, which has abundant inexpensive natural gas resources. However, in 2002, that low cost position was eroded. In 2002, ethylene production costs rose globally as the price of oil also rose above historic levels. Natural gas experienced higher price increases relative to oil, however, with the result that U.S. ethane-based production lost its clear low cost position.

Although the impact on our business is felt particularly hard, the chemical industry is not alone. For example, the U.S. fertilizer industry is similarly dependent upon natural gas and similarly affected, as are its customers, America's farmers. U.S. consumers also are affected in everything from increased home heating and electricity costs to higher prices on consumer goods as production costs rise. Those at the lower end of the income scale are particularly hard hit.

POLICY RECOMMENDATIONS

Faced with the rising demand for natural gas and falling levels of domestic production, and the resultant impact on natural gas prices, it is now more important than ever for Congress to look for ways to promote abundant and diversified sources of domestic energy, including natural gas, coal, oil, nuclear, and cost-competitive renewable resources. Natural gas prices need not be this high. Appropriate policies can ensure adequate supplies of natural gas, helping keep prices at a reasonable level and therefore helping U.S. companies to remain competitive in the global market.

As Congress and this Committee consider how to address our nation's growing energy needs, we urge you to consider the following policies:

- The U.S. must increase its domestic production of natural gas. Recent legislative, regulatory and market trends have placed greater demands on our natural gas supply without providing for commensurate measures to increase production. Congress must take appropriate action to ensure adequate supplies, produced in an environmentally protective manner.
- To do this, Congress must reject initiatives to place moratoria on new exploration and production. In addition, it must open new, promising areas to exploration and production. This includes portions of the Rocky Mountain region, the Outer Continental Shelf areas, and the Eastern Gulf of Mexico and Alaska. Current gas fields are quite mature and failing to adequately meet current demand. Rig counts in these mature fields rose dramatically in response to the 2000-01 price spikes, but gas production did not. Access to new reserves is necessary not only to meet new demands, but simply to sustain current production levels. In

addition, Congress should support environmentally protective development and production of natural gas from coal bed methane.

- Congress also should take action to enable timely increases in the amount of natural gas that is imported to the U.S. via pipelines, particularly from Canada, and in the form of liquefied natural gas ("LNG") from various other countries. In a similar vein, consideration must be given to the disturbing growth of natural gas exports from the U.S. to energy-rich Mexico. The Administration and Congress should seek to work with the Mexican government to develop greater gas and electricity production in that country in order to meet its projected demand and provide opportunities for export to the U.S.
- It is not sufficient to merely have access to ample economic supplies of gas. We must also ensure that this gas can be delivered to the consumer. In this regard, Congress needs to recognize the fundamental change occurring in the energy industry as a whole and in the natural gas industry in particular. During this evolution, the ability of industry participants to capitalize and finance high-risk infrastructure projects to deliver gas from the wellhead to the consumer has been severely limited. It is critical that current federal policies do not exacerbate this capital liquidity problem. It may even be necessary for the federal government to act affirmatively to ensure that critically needed infrastructure can be financed and constructed.
- In addition, Congress should support the FERC's efforts to streamline natural gas pipeline construction to enable gas to enter the mid-continent and Northeastern markets, enhance gas supply and distribution capabilities, and relieve system constraints.
- On the demand side, Congress and the Administration must take a more balanced approach to fuel use and demand. Policies that discourage the use of coal and encourage the use of natural gas to reduce emissions from utility and manufacturing operations must be balanced with policies that ensure adequate supplies of gas to avoid upsetting the demand-supply balance. The adoption by the last Congress, with the blessing of the Administration, of a moratorium on oil and gas production in the Eastern Gulf of Mexico, while faced with legislation that would drive even greater reliance on gas for electric power production, exhibits a gross disconnect between demand and supply policies that simply cannot continue without causing significant damage to the U.S. economy.
- Congress should also encourage the expanded use of highly efficient combined heat and power ("CHP") generation systems. CHP plants are about twice as efficient as traditional utility power plants and are generally located at or near the demand site, which even further improves efficiency by reducing energy lost through transmission "line-loss." The emission and resource use benefits of this technology are obvious. Federal statutes that allow CHP systems to operate in monopoly utility regions must remain. New rules and statutes that promote CHP should be adopted.

Finally, our nation must rely on its natural resource strengths. Certainly our most obvious natural energy resource strength is abundant coal. Congress and the Administration must advance development of electric power production from clean coal technologies. We cannot, as a nation, walk away from such an obvious choice for energy self-reliance. We should take all reasonable measures to advance its use.

Failing the enactment of these and other policies to increase domestic natural gas production and the importation of natural gas from abroad, to expedite the gathering and transportation of such gas, and to improve the efficiency of gas usage, the U.S. will continue to see contraction of the chemical industry, more jobs lost, and a greater reliance upon foreign sources for materials critical to our national economy.

Thank you again for giving us the opportunity to present our views and concerns. We stand ready to discuss these issues and potential legislation, and to assist the Committee in any way we can.

STATEMENT OF THE FERTILIZER INSTITUTE, WASHINGTON, DC

The Fertilizer Institute (TFI) appreciates the opportunity to submit this testimony before the Senate Energy and Natural Resources Committee regarding the natural gas supply and price impact on the fertilizer industry.

TFI is the leading voice of the nation's fertilizer industry, representing the public policy, communication and statistical needs of manufacturers, producers, retailers and transporters of fertilizer. In addition to energy policy, issues of interest to TFI members include the environment, international trade, security, transportation and worker health and safety.

FERTILIZER AND ENERGY

Issue: U.S. manufacturers of fertilizer products are currently facing a natural gas and electricity crisis due to the rising price and lack of supply of natural gas and the increased demand for electricity. These energy sources are essential components in the production of plant nutrients which are, in turn, necessary inputs in the nation's food production system.

Background: The United States needs reliable and plentiful supplies of natural gas for nitrogen fertilizer production, to meet critical agriculture and food production needs. Natural gas is the fundamental feedstock ingredient for the production of nitrogen fertilizer and represents 70 to 90 percent of the production cost of one ton of anhydrous ammonia—the building block for most other forms of commercial nitrogen plant nutrients.

According to the U.S. Department of Commerce, 13.05 million short tons of ammonia were produced in calendar year 2001, with 88 percent of this total used to produce fertilizer. According to The Fertilizer Institute's (TFI) 2000 production cost survey, the production of one ton of ammonia requires an average of 33.6 million British Thermal Units (MMBtu—the standard measure of thermal energy in the United States) of natural gas. Therefore, an estimated 440 trillion Btu's of natural gas were used in 2001 for ammonia manufacturing, consuming about 3 percent of the total U.S. natural gas consumption.

Phosphate and potash fertilizers originate as minerals and are mined from surface (phosphate) and deep shaft (potash) mines, which use significant amounts of "green source" electricity. The U.S. Department of Energy estimates that demand for electricity will increase 43 percent by 2020. If the majority of new electricity-generating plants use natural gas as a fuel source, and if supplies do not keep pace with this growing demand, the North American nitrogen fertilizer industry risks becoming uncompetitive in the world market.

TFI Action: To address the natural gas and electricity crisis currently facing U.S. consumers and fertilizer manufacturers, TFI is working to include the following policy objectives in federal energy legislation:

- Increasing the supply of natural gas through specific production incentives, including tax incentives for natural gas production from marginal wells and sources that are more difficult to find and maintain (tight formation, coal seams and deepwater); selected tax incentives for investment in assets and technologies used in exploring for natural gas; opening of additional federal lands and offshore areas to environmentally sensitive exploration efforts; and increased staff and infrastructure to expedite permitting process for exploration on federal lands and Outer Continental Shelf.
- Elimination of disincentives relating to the use of conventional fuel sources, such as coal, oil and nuclear, for electric power production by allowing owners to make improvements, modifications and expansions of existing coal-fired power plants without invoking the application of new air quality requirements; and expediting the re-licensing process for hydro and nuclear plants.
- Eliminate environmental disincentives so as not to discourage hydrocarbon production. Environmental disincentives such as increased regulations on greenhouse gas and ammonia emissions, water issues preventing coal bed methane production, and regulations that keep energy producing lands out of use, discourage manufacturing and production capability and have negative affects on a healthy economy.
- Increasing natural gas pipeline capacity by expediting and streamlining the approval process for new natural gas pipeline projects.
- Supporting tax and other incentives for the production of electricity from industrial process waste heat sources.
- Supporting research into "clean coal" and coal gasification technologies to produce electricity.
- Promotion of alternative fuel sources such as biomass and renewable fuels.
- Encouraging greater use of energy sources other than natural gas for those uses, unlike fertilizer production, where there is an alternative.
- Providing assistance to farmers facing high-energy costs by providing tax rebates on fuel and/or fertilizer purchases and reduced taxes on diesel fuel.
- Improving electricity delivery infrastructure with the construction of additional electric power transmission lines, supporting the Federal Energy Regulatory Commission's (FERC) efforts to place transmission lines under the control of independent Regional Transmission Organizations (RTOs) when these transfers are completed on a cost effective basis and retail customers are adequately protected from potential long- and short-term market power abuses, delegating fed-

eral powers of eminent domain to RTOs attempting to build FERC-approved lines.

- Ensure that industrial cogenerators and other small power producers have access to the transmission grid on fair and reasonable terms, without cost unfair scheduling penalties, tariff requirements or regulatory impediments. Furthermore, oppose efforts to repeal the Public Utilities Holding Company Act (PUHCA) or the Public Utility Regulatory Policies Act (PURPA).

Questions and Answers

Q. Are there any viable substitutes for natural gas in nitrogen fertilizer production?

A. Natural gas is the fundamental feedstock ingredient, for which there is no practical substitute, for the production of nitrogen fertilizer and the major cost component of making all basic nitrogen fertilizer products. The cost of natural gas represents 70 to 90 percent of the production cost of one ton of anhydrous ammonia nitrogen fertilizer. Anhydrous ammonia is the building block for most other forms of commercial nitrogen plant nutrients and a significant input for many phosphate fertilizers.

Q. What is hedging and to what extent do fertilizer companies hedge gas purchases?

A. When they are faced with fluctuating market prices for natural gas, fertilizer companies can use hedging to reduce the risk of natural gas price fluctuations. Utilizing a variety of tools (including options and futures contracts), a company can “lock-in” the price at which it will buy (or sell) a quantity of natural gas in a particular future month. Obviously, the prices which can be locked-in are those which are available on the futures market at the time of the arrangement; these prices reflect the market’s current expectation of the future market price in the delivery month. Hedging does not guarantee a “low” gas price, and it does not guarantee a “belowmarket” gas price. Indeed, when the delivery month arrives, a company may find that the price it has locked-in is higher than the prevailing spot market price. For this reason, fertilizer companies typically hedge only a portion of their total gas purchases, leaving the remainder for purchase at the prevailing market price in the delivery month. The idea is to “smooth out” natural gas input costs.

Q. Do natural gas prices affect fertilizer prices and what factors determine how much a farmer pays for fertilizer?

A. While the cost of natural gas plays a significant role in determining the profitability of the North American nitrogen fertilizer manufacturing industry, natural gas prices and fertilizer retail prices are not directly related. There are many market variables that ultimately determine the price a farmer pays for fertilizer products. Time of year, transportation costs, proximity from major ports or terminals, weather effects on field work and planting are just a few of the supply/demand market forces that ultimately determine the price of fertilizer.

Q. Where does the United States get its natural gas from?

A. Natural gas used in America for industrial purposes, heating homes and other uses come from numerous oil and gas fields located in many states. Louisiana, Texas, Oklahoma, Wyoming, Alaska, California, Kansas, Colorado, West Virginia, Pennsylvania and the Gulf Coast are just a few of the traditional U.S. oil and gas producing states. A significant but varying amount of natural gas is also imported to the United States from Canada via pipelines.

However, the United States is the most mature oil-producing region in the world, and much of our easy-to-find resource base has been depleted. The Gulf of Mexico, the U.S. East Coast from Maryland to Florida and the U.S. Pacific Coast from the state of Washington all the way down to California’s border with Mexico, are also rich in oil and gas resources. Unfortunately, much of the nation’s oil and gas resource base in these areas reside on federal lands and in federal waters, which is not currently open to exploration or development.

Q. On average, how much did natural gas cost per million Btu in 2002?

A. According to *Natural Gas Week*, the U.S. wellhead natural gas price average for 2002 was approximately \$3.33 mmbtu.

Q. How much do U.S. consumers spend annually on fertilizer?

A. U.S. food producers, lawn and garden specialists and homeowners annually invest more than \$10 billion in fertilizer products.

—URGENT—

To: Senator Jeff Bingaman

From: Jon M. Huntsman

Regarding Outrageous Increases in Natural Gas Pricing

Today, natural gas prices in America increased by over 40% from \$6.61 to \$9.60. This unparalleled spike in prices represents the highest natural gas prices ever. There is pure manipulation going on to cause prices to increase so dramatically. One year ago, prices of natural gas were at \$3.15 per MMBtu. The average price of natural gas for the past ten years is \$2.61. Our company and all others in the chemical industry, and most of the manufacturing jobs in America, will go out of business with gas prices this high. Billions of dollars will be lost in export trade. Millions of jobs are at risk. As our nation moves toward war, our entire manufacturing sector is jeopardized and becoming uncompetitive with the rest of the world. There is no energy policy with this administration. It is killing manufacturing and commerce in America. I repeat, Jeff, we are losing thousands of jobs, and our entire chemical industry because this administration refuses to adopt an energy policy. I am very frightened!

This only happened once before in history—in 2000-2001, Felonious price manipulation existed that almost sank the chemical industry and cost our company hundreds of millions of dollars. Evidence indicated that false trades occurred and the market was fraudulently manipulated. There was enormous turmoil in California and all the western states as a result.

In the longer term, we know that greater use of coal, the advancement of nuclear power and other safe alternatives will transpire, but in the short turn, our company, our industry, and manufacturing in general, as well as the consumer—millions and millions of consumers—are being fraudulently ripped off by big oil companies and futures traders at the New York Mercantile Exchange who establish the prices for natural gas.

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